Comparative Study of Safety and Efficacy of IUD Insertions by Physicians and Nursing Personnel in Brazil[1]

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To assess whether trained nursing personnel could provide IUD services as safely and effectively as physicians in Brazil, an experimental study was conducted at the main clinic of the Center for Research on Integrated Maternal and Child Care in Rio de Janeiro. From November 1984 through April 1986, a total of 1 711 women who requested IUD insertion at the clinic were randomly assigned to have a Copper-T 200 IUD inserted by one of the clinic's 11 physicians or 13 nurses. All of the physicians and nursing staff members who provided these services had taken the Center's standard clinical family planning training course.

Of 860 insertions attempted by the physicians and nurses, 1.3% and 3.3%, respectively, were unsuccessful. Statistically, this difference was very significant ($P < 0.01$). Also, mainly because the cervix was small and undilated, nulliparous women had a relatively high insertion failure rate of 8.0%, as compared to 1.5% for primiparas and 1.0% for multiparas. The overall rate of complications at insertion was 1.8%, these complications including diaphoresis, vomiting, syncope, cervical laceration, and one case of perforation of the uterus; no significant difference was found between the complication rates for insertions performed by physicians as compared to nurses. However, 9.0% of the study subjects reported severe pain during IUD insertion, with significantly higher percentages reporting pain if the IUD was inserted by a physician, or if the subject was nulliparous, had preinsertion symptoms, or had a history of pelvic inflammatory disease (PID) or sexually transmitted disease (STD). It was also found that the nurses had a dramatically high insertion failure rate (11.6%) with nulliparous subjects, while the physicians' failure rate with such subjects was a significantly lower 3.4%. No significant difference was found in the groups served by nurses and physicians with regard to postinsertion complaints or termination of use within 12 months of insertion.

These findings suggest that future training, besides preparing nursing personnel in IUD insertion, should emphasize preparation in taking the client's medical history and diagnosing existing medical symptoms that could be associated with IUD insertion complications. In addition, if a nulliparous woman requests an insertion, it should be performed by a physician or more experienced nursing staff member with close medical supervision. Because of high rates of reported pain at insertion, such women, as well as those with medical symptoms associated with IUD insertion complications and those with a history of PID or STD, should be considered candidates for extra care and counseling. Finally, because a high rate of removal was related to medical symptoms reported by users after insertion, women with postinsertion symptoms should be carefully evaluated and counseled about options for treatment or possible IUD removal.

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Data indicate that only 1% of Brazilian married women 15–44 years of age use intrauterine devices (IUD) for contraception, even though overall contraceptive use is high (66%) in comparison to many other developing countries (*1–3*). Historically, several factors have contributed to low IUD use in Brazil. First, for many years the debate in Brazil over whether the IUD acted as an abortifacient deterred both potential providers and users of the device. Second, until recently IUDs were not manufactured in Brazil, and their importation required complex bureaucratic paperwork involving the Ministry of Health. Third, Brazilian physicians had little knowledge of the method, since their medical education did not include training in IUD insertion and management. Last, the lack of a national family planning program made it difficult for most Brazilian women to learn about the method and gain access to the few IUDs available in the country.

In the early 1980s, however, the situation began to change. As copper IUDs became available, the IUD was recognized as a contraceptive that prevented fertilization rather than as an abortifacient. Domestic production of copper IUDs also began on a small scale. Some medical schools began to include contraception, including training about IUDs, in their curricula. The Ministry of Health launched the Women's Integral Health Care Program (*Programa de Assistencia Integral a Saúde da Mulher*), which became the first national public health program in Brazil to offer family planning services, including the IUD. Still, one of the main problems in making IUD services available to the general population in Brazil has been and remains a shortage of physicians in primary health care settings—a problem commonly encountered in developing countries.

Over the past two decades, many developing countries—including the Philippines and Turkey—have conducted studies to test the feasibility of having health care workers other than physicians provide IUD services (*4, 5*). The results of these studies have generally indicated that trained nurses and other health care personnel can provide IUD services as safely and effectively as physicians. Within this context, an evaluation of auxiliary nurse-midwife training programs in Turkey and the Philippines has shown that the trainees' competency and proficiency in providing IUD services registered a definite improvement during the course of the training (*4*).

To determine whether trained nursing personnel could provide IUD services as safely as physicians in Brazil, an experimental study was conducted at the central clinic of the Center for Research on Integrated Maternal and Child Care (*Centro de Pesquisas de Assistencia Integrada a Mulher e a Crianca*—CPAIMC) from November 1984 through April 1986. CPAIMC was a nonprofit institution that provided primary health care and family planning services, including IUD insertion, to low-income families in Rio de Janeiro. The IUDs used in the study, imported with health ministry authorization, were donated by USAID intermediary donor agencies, which also provided CPAIMC with financial support to train health providers in IUD insertion and management.

OBJECTIVES

Our study had two objectives. First, we tried to determine whether trained nursing personnel[8] would perform IUD insertions as safely as physicians. To that end we compared insertion failures and complications at insertion for IUDs in-

[8]Nursing personnel in Brazil include university degree nurses; technical nurses with high school diplomas and 11 years of education, of which the last 3 years consist of vocational nursing training; and auxiliary nurses with 8 years of education and 1.5 additional years of nursing training.

serted by nurses versus those inserted by physicians. Medical symptoms reported by the patients before and after IUD insertion by the two groups of providers were also compared. Second, we tried to assess the use-effectiveness of IUDs inserted by the two types of providers, for which purpose the IUDs inserted by nurses and physicians were compared with regard to rates of continuation and of termination due to pregnancy, expulsion, or removal.

METHODOLOGY

The study included all women who were eligible to receive the IUD and who voluntarily requested IUD insertion at the CPAIMC central clinic from November 1984 through April 1986. The criteria for ineligibility were CPAIMC's standard contraindications to IUD insertion: suspected or confirmed pregnancy, uterine abnormality, abnormal cervical cytology, or pelvic infection (but not a history of pelvic inflammatory disease—PID). Women included in the study were randomly assigned to have an IUD inserted by one of 11 physicians or 13 nurses at the clinic. The device inserted was the Copper-T 200 IUD. Before the study, all physicians and nursing staff members who provided IUD services had participated in CPAIMC's standard clinical family planning training course.

The training for nurses with university nursing degrees lasted for 6 weeks, including 2 weeks of theory and 4 weeks of practice. Training for technical nurses, and occasionally auxiliary nurses, usually lasted 8 weeks, including 2 weeks of theory and 6 weeks of practice. A minimum of 10 solo insertions was required during practice training. A small number of insertions included in the study were performed by nurse trainees from other institutions. These latter received training that consisted of 1 week of theory and 3 weeks of practice, and that also required 10 solo insertions. During training, all of the nurse trainees were supervised by CPAIMC family planning nurse practitioners.

A patient coming to the clinic for an IUD insertion was given a physical and gynecologic examination during her initial visit. During this and subsequent visits, patients experiencing abnormal gynecologic findings, as well as difficulties or complications with insertions performed by nursing personnel, were referred to a consultant physician for treatment if necessary. In addition, a senior gynecologist was always present in the clinic to care for complicated cases referred by the physicians.

Each patient's basic sociodemographic data, reproductive history, medical conditions, insertion complications, complaints before and after insertion, and results of insertion were recorded. Informed consents were not obtained from the subjects who participated in this study, because we followed the existing standards of normal clinical procedure.

After the IUDs were inserted, all the participating women were asked to return to the clinic for follow-up visits at 1, 6, and 12 months. However, every woman was also encouraged to return to the clinic if she experienced medical problems after the insertion. The nursing staff handled all follow-up visits to the clinic. Women with problems at follow-up who required medical care were referred to a physician. At each follow-up visit, data were recorded on problems such as pregnancy, IUD expulsion, IUD removal, or patient complaints.

In addition, all of the women were given a gynecologic examination at each follow-up visit. Among other things, this checkup served to confirm or deny any reports of devices being expelled. Participating women who had stopped using the device were not scheduled for more follow-up visits. Those who were still using the device at their last visit, but who did not

return to the clinic for their scheduled follow-up visit, were mailed up to four reminders. Follow-ups were discontinued for those who did not return after the four reminders. If the post office returned a reminder letter because the address was inadequate, no further follow-up was attempted.

RESULTS

Patient Characteristics Before Insertion

A total of 1 711 women were admitted for IUD insertion throughout the study period, with 860 and 851 insertions being attempted by the study physicians and nurses, respectively. In spite of the clients being randomly allocated by type of provider, some sociodemographic characteristics and medical conditions of the two groups were significantly dissimilar. Table 1 shows the basic data involved, together with the results of X^2 tests of independence for the types of providers and each variable.

Compared to the clients of nurses, the clients of physicians included a lower percentage of nulliparous women (13.6% vs 17.2%) and a higher percentage of women with a parity of two or more (47.4% vs 42.2%). Therefore, the clients of physicians had a higher mean parity than the clients of nurses (1.66 vs 1.52). This difference in parity distribution between the clients of physicians and nurses was statistically significant ($P < 0.05$).

The age distributions of the clients of the two types of providers were slightly different; but the two groups had almost the same mean ages (27.6 versus 27.7 years), and the difference between them was not statistically significant ($P > 0.05$). Finally, the physicians' clients had fewer years of schooling (an average of 6.1 years) than the nurses' clients (an average of 6.5 years), and this difference was statistically very significant ($P < 0.01$).

Some 20% of the physicians' clients and 17% of the nurses' clients reported preinsertion symptoms such as intermenstrual bleeding, spotting, dysmenorrhea, or pelvic pain. The difference, however, was not statistically significant ($P > 0.05$). On the other hand, a much higher percentage of physician clients than nurse clients (11.2% versus 4.1%) were found to have histories of pelvic inflammatory disease (PID) or sexually transmitted disease (STD). This difference was statistically very significant ($P < 0.01$).

One possible explanation for all these differences, despite the planned randomization carried out, relates to differences in the recorded rates of pelvic inflammatory disease (PID) and sexually transmitted disease (STD) among the clients of nurses and physicians. If (as seems likely) the nurses were relatively poor at accurately detecting PID and STD, then they could have been more likely than the physicians to misdiagnose symptoms related to STD as PID,[9] and so to exclude the misdiagnosed women from the study. Such phantom PID exclusions could have caused the nurses' clients to have significantly lower average parity and significantly higher average education than the physicians' clients, since groups with higher parity and lower education tend to have higher rates of STD.

Insertion Failures, Complications, and Pain

Table 2 shows the percentages of clients experiencing insertion failure, insertion complications, and severe pain at inser-

[9]In 1987, when the study results were first available, the clinical records of 149 PID cases diagnosed by the nurses were reviewed by one of CPAIMC's most experienced nurse practitioners. This person could only confirm that about 34 were indeed PID cases.

Table 1. Characteristics of women requesting IUD insertion, by type of provider (CPAIMC, Brazil, 1984–1986).

Variable	Type of provider			Statistical test of independence†
	Physician (No. of clients = 860)	Nurse* (No. of clients = 851)	Total (No. of clients = 1 711)	
Live births:				
0	13.6%	17.2%	15.4%	
1	39.0%	40.7%	39.8%	$\chi^2 = 6.24$
>1	47.4%	42.2%	44.8%	($P < 0.05$)
Mean parity	1.66	1.52	1.59	
Women's age groups:				
15–24	32.4%	32.1%	32.3%	
25–29	36.4%	33.0%	34.7%	$\chi^2 = 2.92$
30–48	31.2%	34.9%	33.0%	($P > 0.05$)
Mean age	27.6 years	27.7 years	27.6 years	
Years of education:				
0–4	38.1%	34.5%	36.4%	
5–8	39.8%	37.8%	38.8%	$\chi^2 = 9.47$
>8	22.1%	27.6%	24.8%	($P < 0.01$)
Mean years of education	6.1 years	6.5 years	6.3 years	
% reporting preinsertion symptoms‡	*20.1%*	*17.0%*	*18.6%*	*$Z = 1.65$ ($P > 0.05$)*
% reporting previous PID or STD§	*11.2%*	*4.1%*	*7.7%*	*$Z = 5.50$ ($P < 0.01$)*

* In this and subsequent tables, the term "nurse" refers to all classifications of nursing personnel in Brazil: university degree nurses, technical nurses (with high school diplomas), and auxiliary nurses (with 9 years of education). See text footnote 8.
† The χ^2 statistic was used to test the independence between each variable and the type of performer, while the Z score was obtained to test the significance of rate differences between the two types of performers.
‡ Symptoms reported by the client prior to insertion (such as intermenstrual spotting, bleeding, dysmenorrhea, or pelvic pain).
§ Those who reported one or more episodes of pelvic inflammatory disease or sexually transmitted disease prior to insertion.

tion. These rates are also shown for the groups being served by nurses and by physicians, as well as for clients with various sociodemographic characteristics and medical conditions. In all, out of 1 711 insertions attempted, 2.3% were unsuccessful.

Differences in rates of insertion failure by type of provider and client parity were statistically very significant. The rate of insertion failure was 1.3% for insertions attempted by physicians compared to 3.3% for those attempted by nurses. In addition, women with no previous live births (nulliparas) had a relatively high insertion failure rate of 8.0% (mainly because of the small, undilated cervix), while the two groups with higher parity (one or more than one previous live birth) had failure rates of 1.5% and 1.0%, respectively.

Although the rate of insertion failure was somewhat higher for older age groups and more highly educated women, the differences observed were not statistically significant. Likewise, reported preinsertion medical symptoms or a history of PID or STD did not appear significantly related to insertion failure.

Table 2 also indicates that the overall rate of complications at insertion was only 1.8%. Complications associated with insertion of the device included diaphoresis, vomiting, syncope, and cervical

Table 2. Percentages of women with insertion failure, insertion complications, or pain at insertion by type of provider and characteristics of the women (CPAIMC, Brazil, 1984–1986).

Type of provider and characteristics of women	Percentages of women with:		
	Insertion failure	Complication at insertion	Pain at insertion*
Total (1 711)	2.3	1.8	9.0
Type of provider:			
Physician (No. of clients = 860)	1.3	1.7	10.8
Nurse (No. of clients = 851)	3.3	1.8	7.1
	$P = 0.005$‖	$P = 0.977$	$P = 0.008$‖
Live births:			
0 (263)	8.0	3.0	18.3
1 (681)	1.5	1.9	7.5
>1 (767)	1.0	1.2	7.2
	$P < 0.001$‖	$P = 0.127$	$P < 0.001$‖
Women's age groups:			
15–24 (552)	1.5	1.5	6.9
25–29 (594)	2.4	1.9	10.3
30–48 (565)	3.0	2.0	9.7
	$P = 0.215$	$P = 0.798$	$P = 0.103$
Years of education:			
0–4 (622)	1.5	2.1	8.2
5–8 (664)	2.3	2.0	9.2
>8 (425)	3.5	0.9	10.0
	$P = 0.085$	$P = 0.333$	$P = 0.632$
Preinsertion symptoms:†			
No (1 393)	2.4	1.7	7.8
Yes (318)	1.9	1.9	14.2
	$P = 0.603$	$P = 0.841$	$P < 0.001$‖
History of PID or STD:‡			
No (1 580)	2.2	1.8	8.5
Yes (131)	3.8	1.5	14.5
	$P = 0.220$	$P = 0.837$	$P = 0.022$§

* Severe pain felt at insertion.
† Intermenstrual spotting, bleeding, dysmenorrhea, or pelvic pain.
‡ Those who had had pelvic inflammatory disease or sexually transmitted disease before insertion.
§ Statistically significant, $P < 0.05$.
‖ Statistically significant, $P < 0.01$.

laceration. There was also one case of perforation of the uterus. The complication rates for insertions performed by physicians and nurses were low and about equal (1.7% and 1.8%, respectively). Observed differences in the complication rates of clients with different sociodemographic characteristics and medical conditions (age, parity, education, preinsertion symptoms, and PID or STD histories) were not statistically significant.

The last column of Table 2 shows that 9.0% of the clients reported severe pain during insertion. A significantly higher percentage of those whose IUDs were inserted by physicians as opposed to nurses

(10.8% versus 7.1%) reported such pain. Other statistically significant factors included nulliparity, the existence of preinsertion symptoms, and a history of PID or STD. These latter findings suggest that the higher percentage of painful insertions experienced by the physicians' clients (as compared to the nurses' clients) may have occurred because higher percentages of the physicians' clients were found to have preinsertion symptoms or a history of PID/STD (see Table 1).

Since the rate of insertion failure was significantly related to both type of provider and parity, the rate of insertion failure by these two variables was cross-classified (Table 3). The physicians had an insertion failure rate of 3.4% for nulliparous clients compared to 0.9% for clients with higher parity (one or more live births), a difference that was statistically significant ($P < 0.05$). In contrast, the nurses had a dramatically high failure rate of 11.6% for nulliparous clients, as compared to a failure rate of 1.6% for higher-parity clients; the difference between these two latter rates was highly significant
($P < 0.01$).

The overall rate of insertion failure for women with one or more live births was 1.2%. This level of insertion failure is regarded as quite high. Because the prevalence of cesarean section in Brazil is also relatively high,[10] it appears that this high level of insertion failure could be partly accounted for by inclusion of women in the parous category who delivered by cesarean section before there was any dilation of the cervix.

[10]According to a nationwide contraceptive prevalence survey conducted in 1986, 31.6% of the most recent births in Brazil were delivered by cesarean section *(1)*. However, lower socioeconomic groups had lower rates, while urban areas had higher rates than rural areas. The site of the study reported in this article was an urban Rio de Janeiro slum.

IUD Use-effectiveness

To evaluate the use-effectiveness of IUDs inserted by different providers, we used life-table techniques to analyze data for clients who had had their devices successfully inserted during the study period (November 1984 through April 1986). To ensure that all these clients were observed for at least one full year after initial acceptance of the device, the cutoff date for the study was set at 30 June 1987. Partly because not all cases were actively followed up, 121 of the 1 672 women with successfully inserted IUDs never returned to the clinic. Those who never returned (representing 7.2% of the overall sample, 8.1% of the physicians' clients, and 6.3% of the nurses' clients) were excluded from the analysis. Thus, a total of 1 551 cases were available for the life-table analysis.

In the life-table analysis, 46.0% of all the cases (47.2% of the physicians' clients and 44.7% of the nurses' clients) were censored at less than one year because they were lost to follow-up. However, 62.0% of all the cases who were lost to follow-up were observed for more than six months. Because the life-table analysis excluded the 7.2% of the women who never returned to the clinic after the initial visit for IUD insertion but included the 46.0% of the women who were censored at less than one year because they were lost to follow-up, the results of that analysis may not reflect the true levels of IUD use-effectiveness. Nevertheless, these data are valid for comparing the performance of IUDs being inserted by the physicians and the nurses as long as the two groups did not differ greatly in terms of the rates of exclusion and the proportions lost to follow-up.

Table 4 shows the life-table continuation and termination rates of IUD use at 12 months following insertion by the type of provider performing the insertion. The rates shown in the table are cumulative

Table 3. Rate of IUD insertion failure, by type of provider and demographic characteristics of clients. The numbers in parentheses refer to the number of clients. (CPAIMC, Brazil, 1984–1986.)

Characteristics of women	Rate of insertion failure by type of provider					
	Physician		Nurse		Total	
	%	(No.)	%	(No.)	%	(No.)
Parity:						
0	3.4	(117)	11.6	(146)	8.0	(263)
≥1	0.9	(743)	1.6	(705)	1.2	(1 448)
	$P = 0.027$*		$P < 0.001$†		$P = .005$†	
Women's age groups:						
15–24	0.4	(279)	2.6	(273)	1.5	(552)
25–29	1.0	(313)	3.9	(281)	2.4	(594)
30–48	2.6	(268)	3.4	(297)	3.0	(565)
	$P = 0.052$		$P = 0.067$		$P = 0.215$	
Years of education:						
0–4	1.5	(328)	1.4	(294)	1.5	(622)
5–8	1.4	(342)	3.1	(322)	2.3	(664)
>8	0.5	(190)	6.0	(235)	3.5	(425)
	$P = 0.578$		$P = 0.013$*		$P = 0.603$	
Total	*1.3*	*(860)*	*3.3*	*(851)*	*2.3*	*(1 711)*

* Statistically significant, $P < 0.05$.
† Statistically significant, $P < 0.01$.

totals of the monthly rates following IUD insertion; they therefore reflect the data censored at less than 12 months for the full known length of exposure. Differences in the continuation rates of the doctors' and nurses' clients were negligible. The table also shows the life-table gross cumulative termination rates for reasons of pregnancy, expulsion, and removal (for listed causes) by type of provider. No significant differences were observed between the termination rates (whether for

Table 4. Life-table cumulative rates of IUD continuation and termination at 12 months after insertion, by type of termination and type of provider. SE = standard error. (CPAIMC, Brazil, 1984–1986.)

Continuation and type of termination	Rate of termination by type of provider					
	Physician		Nurse		Total	
	%	(SE)	%	(SE)	%	(SE)
Continuation rate	*74.4*	*(2.0)*	*75.2*	*(1.9)*	*74.9*	*(1.4)*
*Termination rate**	*25.6*	*(2.0)*	*24.8*	*(1.9)*	*25.1*	*(1.4)*
Pregnancy	1.4	(0.5)	1.0	(0.5)	1.2	(0.3)
Expulsion	5.3	(0.9)	5.0	(0.8)	5.1	(0.6)
Removal	21.6	(2.0)	20.8	(1.9)	21.1	(1.4)
*Reasons for removal:**						
Medical reasons	8.7	(1.4)	6.2	(1.1)	7.4	(0.9)
Planned pregnancy	6.3	(1.2)	5.8	(1.1)	6.1	(0.8)
Other reasons	8.2	(1.4)	10.2	(1.5)	9.2	(1.0)

* Notice that the total rate of termination is less than the sum of the three rates of reasons for termination (pregnancy, expulsion, and removal) because these three rates were computed as gross rates without considering competing risks. Likewise, the three rates of reasons for removal were computed as gross rates.

Table 5. Percentages of IUD users reporting complaints before and after IUD acceptance, by type of provider (CPAIMC, Brazil, 1984–1986).

Type of provider	% having a complaint		
	Before IUD acceptance (1)	After IUD acceptance (2)	Difference (2 - 1)
Physician (780)	20.5	46.3	25.8
Nurse (771)	17.1	42.2	25.1
Total (1 551)	18.8	44.3	25.5

pregnancy, expulsion, or removal) of clients served by the two types of providers.

IUD Side-effects

To detect side-effects associated with IUD use, we compared rates of complaints reported by women before IUD insertion at the initial visit with rates of complaints reported at the last follow-up visit, by type of provider (Table 5). Both the preinsertion and postinsertion complaints consisted mainly of abdominal pain, lumbago, and intermenstrual bleeding. There was no established period of retrospection for preinsertion complaint symptoms. The physicians reported a higher rate of clients with preinsertion symptoms (20.5%) than did the nurses (17.1%). However, the increases in the complaint rates reported by the physicians and the nurses were comparable (25.8% and 25.1%, respectively).

DISCUSSION

Especially in a country short of physicians, trained nursing personnel have an important role to play in primary health care settings. This study found that trained nurses, using the standard training and operating procedures at CPAIMC, provided IUD services to family planning clients as safely and effectively as physicians. Whether insertions were performed by physicians or nurses, the rate of complications at insertion was very low. The nurses had a higher rate of insertion failure than the physicians, apparently because the nurses had a higher proportion of nulliparous clients and also because they had a higher rate of insertion failure while working with nulliparous clients than did the physicians.

IUD use-effectiveness as well as side-effects appeared unrelated to whether the devices were inserted by physicians or nurses. Relative to other Brazilian studies using the same type of IUD, the use-effectiveness of the IUD observed in this study was characterized by very low pregnancy and expulsion rates, together with high rates of both removal and continued use (*5, 6*). Relative to other studies conducted with the Copper-T 200 IUD elsewhere in the world (*7*), the continuation, pregnancy, and expulsion rates found in our study fall within the same range as the results of those studies. However, the removal rate found in our study was somewhat higher than the maximum rates found in the other countries.

The experience and findings of this study also have important implications for further improvement in training and using nursing personnel to provide IUD services. First, besides training nursing personnel in the skill of IUD insertion, such training should also emphasize skill in taking the client's medical history and diagnosing existing medical symptoms such as cesarean sections, PID, and STD that may be associated with IUD insertion complications. Second, because higher proportions of nulliparous women and women with medical symptoms or

histories of PID/STD seemed to experience severe pain during IUD insertion, extra care and counseling should be considered for these clients. Third, according to the norms of the Program for Maternal and Infant Health of the Ministry of Health, IUDs are not to be inserted in nulliparous women.[11] However, if a nulliparous woman requests such an insertion, to minimize the risk of insertion failure that insertion should be performed by a physician or by a more experienced nursing staff member with close medical supervision. Finally, because a high rate of removal was related to medical symptoms reported by users after insertion, women with such symptoms should be carefully evaluated and counseled about options for treatment or possible IUD removal.

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[11]Since the CPAIMC clinics are within the private sector, their norms of clinical procedure conform to those established by the Brazilian Obstetric and Gynecology Association, according to which IUD insertion is provided for nulliparous women who request it.

REFERENCES

1. Arruda JM, Rutenberg N, Morris L, Ferraz EA. *Pesquisa nacional sobre saúde materno-infantil e planejamento familiar, Brasil, 1986*. Rio de Janeiro: Sociedade Civil Bem-estar Familiar do Brasil; 1988.
2. Wawer MJ, Lassner KJ, Hanff BBC. Contraceptive prevalence in the slums of Rio de Janeiro. *Stud Fam Plann* 1986;17(1): 44–52.
3. Ferraz EA, Ferreira IQ, Ruttenberg N. *Pesquisa sobre saúde familiar no Nordeste Brasil 1991*. Rio de Janeiro, Brazil, and Columbia, Maryland, USA: Sociedade Civil Bem-Estar Familiar do Brasil; October 1992.
4. Akin A, Gray RH, Ramos R. Training auxiliary nurse-midwives to provide IUD services in Turkey and the Philippines. *Stud Fam Plann* 1980;11(5):178–187.
5. Eren N, Ramos R, Gray RH. Physicians vs. auxiliary nurse-midwives as providers of IUD services: a study in Turkey and the Philippines. *Stud Fam Plann* 1983; 14(2):43–47.
6. Diaz J, Faundes A, Diaz MM, Pinotti JA. Comparative clinical trial of two models of copper IUDs in Campinas, the T-Cu 200 and the Multiload-Cu 250. *J Bras Ginecol* 1985;95(8):363–366.
7. Sivin I. The effectiveness of the Copper-T intrauterine device: a collaborative study in five countries. *Stud Fam Plann* 1973; 4(7):162–170.