

# POST-ABORTION CONTRACEPTIVE ACCEPTANCE AND CHOICE DETERMINANTS AMONG WOMEN RECEIVING ABORTION CARE AT SAINT PAUL'S HOSPITAL, ADDIS ABABA, ETHIOPIA

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## ABSTRACT

**BACKGROUND:** The Ethiopian DHS in 2016 estimates that 412 women died of pregnancy related causes for every 100,000 live births. In 2008, an estimated 382,000 induced abortions were performed in Ethiopia. To reduce rates of unplanned pregnancy and unsafe abortion, increased access to high-quality contraceptive care is needed.

**OBJECTIVES:** To determine the contraceptive acceptance rate and examine factors associated with choice of contraception, in particular modern and long acting methods, in women after an abortion.

**METHODS:** A cross-sectional study was undertaken at Saint Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia. Women who received post abortion care service and had induced abortion from January to June 2015 were included. Logistic regression was used to determine factors associated with acceptance and choice of method of contraceptives.

**MAJOR FINDINGS:** A total of 552 women were included in the study; 90.6% of them adopted modern contraception post-abortion and 19% received long acting reversible contraceptives.

Multivariable analysis showed that being a housewife, married and parity greater than one had statistically significant association with the odds of adopting any modern method of contraception after abortion. Adoption of LARC was positively associated with being student, with parity greater than one and induced type of abortion.

**CONCLUSION:** The post abortion contraceptive acceptance rate was higher than other studies done in Ethiopia. Higher parity, being married and a housewife were independent predictors of modern contraceptive method acceptance. Induced abortion, higher parity and being student were significant predictors of adoption of LARC.

**KEYWORDS:** Abortion, Contraception, Long acting reversible contraceptive, Choice, Ethiopia

## INTRODUCTION

The Ethiopian Demographic and Health Survey (DHS) in 2016 estimates that 412 women died of pregnancy related causes for every 100,000 live births<sup>1</sup>. The World Health Organization (WHO) estimates that in Eastern Africa, unsafe abortion accounts for one in seven maternal deaths<sup>2</sup>. In a 2001–2002 study in a major university hospital in Addis Ababa, post-abortion complications were one of the three leading causes of maternal mortality, contributing to 28.9% of the deaths<sup>3</sup>.

In 2008, an estimated 382,000 induced abortions were performed in Ethiopia. Overall, about 42% of pregnancies were unintended. To reduce rates of unplanned pregnancy and unsafe abortion, increased access to high-quality contraceptive care is needed<sup>4</sup>.

There is a large gap between actual fertility and women's average preferred family size in Ethiopia. Unmet need for family planning is 22% among married women<sup>1</sup>. Promoting the use of contraceptive methods to prevent unwanted pregnancies is one of the most effective strategies to reduce abortion rates and related maternal morbidity and mortality<sup>5-7</sup>.

Studies investigating post-abortion contraception practices demonstrate that method adopted varies widely depending on individual demographics and context<sup>5,8-13</sup>. Addressing women's reproductive health needs requires a more focused approach to delivering client-centered care<sup>(6)</sup>. There is the need to implement family planning services targeted to women in post abortion because it is the ideal period of high contraceptive demand among women reducing the risk of unwanted pregnancy and therefore unsafe

abortion<sup>13</sup>.

Women offered immediate post abortion contraception are more likely to choose the intrauterine device (IUD) and implant than women without a recent abortion history. Increasing access to immediate post abortion long acting reversible contraceptives is essential to preventing repeat unintended pregnancies<sup>9</sup>.

Around 1,200 women receive abortion care in the hospital annually (Statistics office of the hospital). The main aim of this paper was to determine the contraceptive acceptance rate and to examine factors associated with choice of contraceptive, in particular modern and long acting methods, after an abortion.

## SUBJECTS AND METHOD

Cross-sectional study was conducted from January to June 2015. Data were gathered by conducting patient exit interview on women who received abortion care service and treated for complications of abortion in the study period at the time of discharge. In the hospital all women were counseled on post abortion contraceptives as part of the standard care. Those who agreed to use contraceptive were provided the method of their choice for free in the same ward before being discharged.

All patients treated in the study period were invited to participate in the study. Women who died before being discharged from hospital were excluded from the study. No sample size calculation was conducted as all patients on the study period were included in the study.

The independent variables were age, place of residence, level of education, occupation, religion, marital status, gravidity, parity, number of living children,

number of previous abortions, gestational age at the time of abortion, induced or spontaneous abortion, planned or unplanned pregnancy, and previous contraceptive use. The dependent variables were contraceptive acceptance and types of modern contraceptive chosen.

Concerning operational definitions look the following. Abortion was defined as termination of a pregnancy before 28 weeks of gestation. Spontaneous abortion is defined as an abortion occurring without any medical or surgical means to empty uterus. Induced abortion is defined as an abortion that occur with any medical or surgical intervention either in or outside the hospital. Post abortion care (PAC) is defined as management of incomplete abortion and complications resulting from unsafely induced or spontaneous abortion. Type of contraception adopted was originally collected categorically. The pills, implant, condom, injectables, implant, IUD and bilateral tubal ligation were classified as modern methods, and Implants and IUDs were classified as Long-acting reversible contraceptive (LARC) method.

Data were collected using a structured questionnaire. The questionnaire was first prepared in English then translated into the local language (Amharic) and data collected through exit interview at the time of discharge of the women. Data collection was done by nurses, who were not involved in the care of the women, after orientation by the principal investigator and a supervisor. An operational manual for the study, with detailed instruction to the data collectors, was prepared. Each questionnaire was checked for completeness by supervisor and coded every two weeks.

Those with incomplete data were omitted.

The collected data were entered into an Excel spreadsheet and analyzed using SPSS Windows version 20.0. Frequencies and cross tabulations were used to summarize descriptive statistics of the data for presentation. Bivariate analysis was used primarily to check which variables had association with the dependent variables individually. All variables found to have an association with the dependent variables were then entered into logistic regression for controlling the possible effect of confounders and finally all the variables which had significant association were identified on the basis of OR, with 95%CI and p-value <0.05 to fit into the final regression model.

A formal letter of approval was obtained from the college's ethical review committee. Permission to conduct the study was taken from the hospital administration. Informed consent was taken from each woman and she was informed of her right to exit from the interview any time. Each woman was told the participation was voluntary.

There were no direct benefits to the women for being a part of this study. The only potential risk was that of data being seen by people not on the study team. In order to reduce this potential risk, all data were de-identified before it is entered into the study database. All data were collected and stored anonymously. The study team did not collect any identifying information about participants.

## RESULTS

A total of 574 women received abortion care over the study period of which 559 (97.4%) were included in the study. Fifteen women were not included; six of

them did not give consent and nine of them were discharged from the hospital before being interviewed. There were 552 (98.75%) from 559 women who had complete data recorded for all the variables included in the final analysis.

Most were young, uneducated or attended only primary school, and married. The mean ( $\pm$  SD) age of the respondents was 26.55 ( $\pm$ 5.60) years and the majority (32.2%) of the respondents were in the age group of 25-29 years. The majority of the respondents were urban dwellers from Addis Ababa (72.1%) and one third of them employed (34.2%)

see Table 1.

While women had an average of 2.6 ( $\pm$ 1.82) pregnancies, the average number of child birth was 1.28 ( $\pm$ 1.65). About two third of the abortions occurred in the first trimester of the pregnancy. More women came to the health facilities seeking post-abortion care (88.6%) than safe abortion (13.4%). Most of the pregnancies were intended (76.6%) as shown in the Table 2.

About 63% of women were using a modern method contraceptive method prior to presenting for abortion-related services. From this, the majority were using injectables (66%) as last modern family planning method (Table 3). About 90.6% of women adopted some method of contraception post abortion. Injectables were chosen by more than half of all the women 310 (56.2%). Nearly 19% of the clients received LARC. One in ten women elected not to use any contraception (52; 9.4%) see Table 4.

**Table 1 Demographic characteristics at the time of the abortion of women receiving abortion care at Saint Paul's hospital from January to June 2015.**

	No. (%)
Age group (years)	52 (9.2%)
< 19	
20-24	157 (28.4%)
25-29	178 (32.2%)
30-34	98 (17.8%)
35-49	68 (12.3%)
Residential area	
Rural	74 (13.4%)
Urban (outside of Addis Ababa)	80 (14.5%)
Urban (in Addis Ababa)	398 (72.1%)
Level of education	
Not educated	153 (27.7%)
Primary	218 (39.5%)
Secondary	122 (22.1%)
Tertiary*	59 (10.7%)
Religion	
Orthodox	397 (71.9%)
Muslim	110 (19.9%)
Others**	45 (8.2%)
Occupation	
Unemployed	166 (30.1)
Student	28 (5.1%)
Employed	189 (34.2%)
Housewife	169 (30.6%)
Marital status	
Single	91 (16.5%)
Married	455 (82.4%)
Divorced and widowed	6 (1.1%)
*college, university	
**protestant, catholic	

**Table 2 Reproductive characteristics at the time of the abortion of women receiving abortion care at Saint Paul's hospital from January to June 2015.**

	No. (%)
<b>Parity</b>	
Nulliparous	243 (44%)
Primiparous	117 (21.2%)
Above primiparous	192 (34.8%)
<b>Previous abortion</b>	
No	415 (75.2%)
Yes	137 (24.8%)
<b>Gestational age (current abor-</b>	
<b>1<sup>st</sup> trimester</b>	368 (66.7%)
<b>2<sup>nd</sup> trimester</b>	184 (33.3%)
<b>Current abortion</b>	
Spontaneous	478 (88.6%)
Induced	74 (13.4%)
<b>Method of abortion</b>	
Medical	91 (16.5%)
Surgical	449 (81.3%)
Both medical and surgical	12 (2.2%)
<b>Intended pregnancy</b>	
Yes	423 (76.6%)
No	129 (23.4%)

Nearly 43% of women left the facility with the same contraceptive method they had previously been using. Specifically, 71% of women who had previously been using injectables left with injectables, 34.6% of women who had previously been using pills left with pills, 28% of women who had previously been using implants left with implants and 19% of women using no method continued to use no method (Table 5).

Multivariable logistic regression showed that being housewife (adjusted odds ratio [AOR], 3.43; 95% CI, 1.20-9.80), married (AOR, 3.31; 95% CI, 1.41-7.74) and parity greater than one (AOR, 2.70; 95% CI,

**Table 3 Contraceptives characteristics before abortion of women receiving abortion care at Saint Paul's hospital from January to June 2015.**

	No. (%)
<b>Ever use of modern family planning method</b>	
Yes	350 (63.4%)
No	202 (36.6%)
<b>Last modern family planning method used</b>	
None	203 (36.8%)
Pills	78 (14.1%)
Condom	3 (0.5%)
Injectables	231 (41.8%)
Implant	25 (4.5%)
IUD	12 (2.2%)

1.04-7.03) had statistically significant association with the odds of adopting any modern method of contraception after abortion. Age groups, residential area, educational level, religion and type of abortion were not significantly associated with the odds of leaving the post-abortion care services with a modern family planning method (Table 6).

The odds of adoption of a LARC was positively associated with being student CI, 1.50-14.22), with parity greater than one (AOR, 2.21; 95% CI, 1.12-4.36) and induced type of abortion (AOR, 2.91; 95% CI, 1.46-5.80). However, it was negatively associated with ter-

**Table 4 Post abortion contraceptives characteristics of women receiving abortion care at Saint Paul's hospital from January to June 2015.**

	No. (%)
Accepted a post abortion modern contraceptive method	
No	52 (9.4%)
Yes	500 (90.6%)
Accepted a post abortion long acting reversible contraceptive method	
No	449 (81.3%)
Yes	103 (18.7%)
Method of contraceptive adopted after the abortion.	
None	52(9.4%)
OCP	81 (14.7%)
Condom	4 (0.7)
Injectables	310 (56.2%)
Sterilization*	2 (0.4%)
Implant	91 (16.5%)
IUD	12 (2.2%)
Client fertility choice	
Stop childbearing	18 (3.6%)
Postpone childbearing	482 (96.4%)

\* bilateral tubal ligation

tiary level of education (AOR, 0.66; 95% CI, 0.10-0.93), being married (AOR, 0.46; 95% CI, 0.25-0.86) and with previous use of family planning (AOR, 0.51; 95% CI, 0.31-0.85). (Table 7)

**Table 5: Pre and post abortion contraceptive methods among women who received abortion care at Saint Paul's hospital from January to June 2015.**

	Method of contraceptive adopted							Total
	Pills	Condom	Injectables	Implant	IUD	None	Sterilization	
Pills	27(34.60%)	0(0%)	38(48.70%)	11(14.10%)	1(1.30%)	1(1.30%)	0(0%)	78(100%)
Condom	0(0%)	1(33.30%)	1(33.30%)	1(33.30%)	0(0%)	0(0%)	0(0%)	3(100%)
Injectables	24(10.30%)	0(0%)	165(71.10%)	25(10.80%)	5(2.20%)	13(5.60%)	0(0%)	232(100%)
Implant	3(12%)	0(0%)	12(48%)	7(28%)	3(12%)	0(0%)	0(0%)	25(100%)
IUD	1(8.30%)	0(0%)	8(66.70%)	2(16.70%)	1(8.30%)	0(0%)	0(0%)	12(100%)
None	26(12.90%)	3(1.50%)	86(42.80%)	45(21.90%)	2(1%)	38(18.90%)	2(1%)	202(100%)

## DISCUSSION AND CONCLUSION

The level of post-abortion contraceptive acceptance in this study was 90.6%. Parity greater than one, being married, and being a housewife increased the odds of adopting modern family planning methods. Nearly 19% of this study sample adopted a LARC method. The odds of uptake of LARC increased with parity greater than one, being student and induced type of abortion. The odds of such uptake decreased with tertiary level of education, being married and with previous use of family planning.

The 90.6% of post-abortion clients who accepted contraception is below a study conducted in India and one in Brazil which found 100% (14) and 97.4% (15) acceptance respectively. A study conducted in Tanzania found post-abortion contraceptive use of 90%, similar to this study finding<sup>5</sup>. However, the result of this study found a higher rate of post-abortion contraception acceptance than research done in Addis Ababa in 2011 and in Gondar, Ethiopia in 2014 which showed contraceptive acceptance after abortion at 86% and 74.7% respectively<sup>10, 12</sup>. Post-abortion contraceptive service, which is provided free of charge at Saint Paul's hospital, has increased the availability for all women. The studies done in Addis Ababa and Gondar included clients from private health institution where there might have been fees for contraceptive. This might explain the increased uptake when compared with other studies done in Ethiopia. Prior research also indicated that clients are most likely to receive contraception when contraceptive counseling and supplies are provided at the time of abortion ser-

vice<sup>16, 17</sup>.

Women with higher parity had increased the odds of modern family planning methods acceptance. This might be explained by the fact that women with more children are likely to be motivated to use contraceptive. Married women were more likely to accept post-abortion contraceptive method than singles. This is similar finding to the study done in Gondar<sup>(12)</sup>. Single women might think that they are not at risk of pregnancy and chose not to use contraceptive, or might be reluctant to admit they are engaging in pre-marital sex. This study finding contradicted findings from previous research conducted in Addis Ababa<sup>10</sup>.

The most popular contraceptive method was injectables in this study. From ever users of modern contraceptives, 41% were using it as the last contraceptive method prior to the abortion. This is in line with EDHS 2011 in which injectables (21%) was the most commonly used method<sup>1</sup>, although the magnitude in this study was almost double the rate found in the DHS. Injectables were chosen by more than half of the women (56.2%) as their post-abortion contraceptive.

The study conducted in Gondar, Ethiopia found 57% of post-abortion clients intended to use the injectables which are similar findings to this study<sup>(13)</sup>. Nevertheless, this study findings were higher than the research done in Addis Ababa, Ethiopia and in Gabon which showed injectables acceptance after abortion of 18% and 14.6% respectively<sup>10, 18</sup>.

The fact that many of the women (43%) adopted the same method post-abortion that they had been using previously indicates a missed opportunity to better

**Table 6 Association of variables with contraceptive acceptance after pregnancy termination among women who received abortion care at Saint Paul's hospital from January to June 2015.**

Contraceptive acceptance			COR (95%CI)	AOR (95%CI)
	No	Yes		
Age group (years)				
< 19	7	44	1	1
20-24	17	140	1.31(0.51-3.36)	0.78(0.25-2.41)
25-29	18	160	1.41(0.56-3.60)	0.48(0.15-1.57)
30-34	5	93	2.96(0.90-9.85)	0.80(0.17-3.63)
35-49	5	63	2.01(0.60-6.73)	0.36(0.08-1.70)
Residential area				
Rural	7	67	1	1
Urban (outside of Addis Ababa)	6	74	1.29(0.41-4.03)	1.85(0.52-6.59)
Urban (in Addis Ababa)	39	359	0.93(0.41-2.24)	1.70(0.58-4.95)
Level of education				
Not educated	11	142	1	1
Primary	24	194	0.63(0.30-1.32)	0.72(0.29-1.77)
Secondary	8	114	1.10(0.43-2.84)	0.93(0.30-2.81)
Tertiary	9	50	0.43(0.17-1.10)	0.46(0.14-1.51)
Religion				
Orthodox	36	361	1	1
Muslim	13	97	0.74(0.38-1.46)	0.58(0.27-1.26)
Others	3	42	1.40(0.41-4.73)	1.68(0.45-6.62)
Occupation				
Unemployed	22	144	1	1
Student	6	22	0.56(0.20-1.54)	1.03(0.29-3.70)
Employed	19	170	1.37(0.71-2.63)	1.39(0.65-2.96)
Housewife	5	164	5.01(1.85-13.57) *	3.43(1.20-9.80) *
Marital status				
Single	21	70	1	1
Married	26	426	4.41(2.38-8.16) *	3.31(1.41-7.74) *
Divorced and widowed	2	4	0.600(0.103-3.509)	0.51(0.07-3.71)
Parity				
Nulliparous	35	208	1	1
Primiparous	7	110	2.64(1.14-6.15)*	2.16(0.86-5.44)
Above primiparous	10	182	3.06(1.48-6.36) *	2.70(1.04-7.03) *
Previous abortions				
No	43	372	1	1
Yes	9	128	1.644(0.780-3.466)	1.23(0.54-2.79)
Type of abortion				
Spontaneous	37	441	1	1
Induced	15	59	0.33(0.17-0.64) *	0.76(0.26-2.24)
Planned pregnancy				
Yes	33	390	1	1
No	19	110	0.49(0.27-0.90) *	1.19(0.44-3.23)

\*P &lt; 0.05 and confidence interval for the odds ratio does not include one in the interval



**Table 7 Association of variables with long acting reversible contraceptive acceptance after pregnancy termination among women who received abortion care at Saint Paul's hospital from January to June 2015.**

Long acting reversible contraceptive acceptance			COR (95%CI)	AOR (95%CI)
	No	Yes		
Age group (years)				
< 19	41	10	1	1
20-24	128	29	0.93(0.42-2.07)	2.12(0.75-5.00)
25-29	146	32	0.90(0.41-1.98)	1.82(0.62-5.33)
30-34	83	15	0.74(0.31-1.79)	1.20(0.36-4.01)
35-49	49	19	1.59(0.67-3.80)	2.26(0.67-7.60)
Residential area				
Rural	51	23	1	1
Urban (outside of Addis Ababa)	69	11	0.35(0.16-0.79) *	0.48(0.19-1.17)
Urban (in Addis Ababa)	327	71	0.48(0.28-0.84) *	0.80(0.32-1.65)
Level of education				
Not educated	118	35	1	1
Primary	176	42	0.81(0.49-1.33)	0.96(0.52-1.78)
Secondary	100	22	0.74(0.41-1.35)	0.77(0.37-1.62)
Tertiary	53	6	0.38(0.15-0.96) *	0.31(0.10-0.93) *
Religion				
Orthodox	316	81	1	1
Muslim	97	13	0.52(0.28-0.98) *	0.61(0.31-1.19)
Others	34	11	1.26(0.61-2.60)	1.66(0.76-3.64)
Occupation				
Unemployed	139	27	1	1
Student	18	10	2.86(1.19-6.87) *	4.62(1.50-14.22) *
Employed	152	37	1.25(0.73-2.17)	1.48(0.81-2.71)
Housewife	138	31	1.16(0.66-2.04)	1.36(0.73-2.54)
Marital status				
Single	64	27	1	1
Married	378	77	0.48(0.23-0.81) *	0.46(0.25-0.86) *
Divorced and widowed	5	1	0.47(0.05-4.25) *	0.43(0.04-4.13)
Parity				
Nulliparous	203	40	1	1
Primiparous	96	21	1.11(0.62-1.99)	1.73(0.88-3.38)
Above primiparous	148	44	1.51(0.94-2.43)	2.21(1.12-4.36) *
Previous abortions				
No	339	76	1	1
Yes	108	29	1.20(0.74-1.94)	1.52(0.90-2.56)
Type of abortion†				
Spontaneous	401	77	1	1
Induced	46	28	3.17(1.87-5.38) *	2.91(1.46-5.80) *
Ever use of modern family planning				
No	152	50	1	1
Yes	295	55	0.57(0.37-0.87) *	0.51(0.31-0.85) *

\*P < 0.05 and confidence interval for the odds ratio does not include one in the interval

†Category excluded from logistic regression analysis

meet women's contraceptive needs through family planning counseling. Women might be more comfortable with a contraceptive method with which they are familiar, which makes appropriate counseling even more important.

Long-acting reversible contraceptive methods were received by nearly 19% of the clients. This was higher than the studies done in Addis Ababa, Ghana and Gabon which were 3% (10), 15% (19) and 9.3% (18) respectively. But it was lower than the studies done in Gondar, Ethiopia and Australia which showed acceptance rate of LARC at 27% and 27.4% respectively<sup>13,20</sup>. Long-acting reversible contraceptive methods are effective in reducing unintended pregnancies and have been shown to reduce future unintended pregnancies and repeat abortions among abortion clients<sup>21,22</sup>. Consequently, effective contraceptive methods need to be made available, particularly LARC owing to their greater efficacy in avoiding unintended pregnancies and induced abortions<sup>23</sup>. Increased advocacy for LARC by federal ministry of health, in addition to the availability for all women free of charge at Saint Paul's hospital, might be the reason behind the higher uptake compared to the studies in Addis Ababa, Ghana and Gabon.

Women with more parity or whose abortion had been induced were more than twice as likely to opt for a LARC method compared with those with lower parity or whose abortion was spontaneous. These two variables were associated with choosing a LARC method in the multiple regression analysis. Their motivation to ensure that they did not get pregnant again in the immediate future might be much greater than those

women who had lower parity and those who had a spontaneous abortion. A similar association was found in the study done in a principal maternity hospital in Gabon<sup>18</sup>.

There was also higher uptake of LARC in students than in women with other occupations in the multiple regression analysis. There was a similar finding in Gabon<sup>(18)</sup>. This might be explained by the fact that those who aspire to a better education are more motivated to use an effective contraceptive method. It was interesting to mention here that those women who achieved higher level of education (tertiary level) have lower uptake of LARC than women who are not educated.

Married women have decreased odds of uptake of LARC than those who are single. This might be due to the fact that most of pregnancies in married women were intended pregnancies that ended up with spontaneous abortion and they might need to conceive earlier than singles.

Previous ever use of family planning method before the abortion decreased acceptance of LARC by 50%. This could be explained by the fact that most of these women left with the same contraceptive method they had been using prior to the abortion and the most common previously used contraceptive was injectables. Ensuring that women have high quality contraceptive counseling that educates them about all available methods, not only the ones they are familiar and have experience with, might increase the number of women who adopt LARC methods.

The study's largest strength lies in the fact that the researcher had a wealth of data about each woman

which allowed us to investigate different types of relationships, control for previously established confounders and stratify on important factors. Contraceptive counseling was given for all women as part of post-abortion care. All methods (OCP, condom, injectables, sterilization, implant and IUD) were available for all women during the study period and were provided for free before discharge. Despite these strengths, the study did have limitations. Women were not followed prospectively once they received their method post-abortion, so we do not know the patterns of use or continuation. Further follow-up study is needed to know whether or not they continued use of contraceptive method after discharge.

In conclusion, the post abortion contraceptive acceptance rate was higher than other studies done in Ethiopia. Higher parity, being married and a housewife were independent predictors of modern contraceptive method acceptance. Induced abortion, higher parity and being student were significant predictors of adoption of LARC.

While abortion care offers an opportunity to improve contraceptive uptake, there should be increased advocacy and multipronged activity by the hospital and federal ministry of health to further increase the acceptance of LARC post abortion. Increasing the availability, promoting access, and provision of modern and long-acting contraceptives could reduce the risk of unwanted pregnancies and potentially unsafe abortion. Further, a research which assesses follow-up discontinuation rates of contraceptive methods after discharge of the clients is an important next step.

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Competing interests

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