

Understanding Contraceptive Discontinuation in Nepal



February 2020

Determining discontinuation rates of short-acting and long-acting reversible contraceptive methods and factors associated with them: A prospective population-based cohort study in Nepal.

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Acknowledgments:

Our big thank you to everyone who was involved in this important study.

We would like to thank UNFPA Nepal Family Planning Project (UNFPP) under which this study was carried out. And the UKaid for the funding support.

List of abbreviations

CI	Confidence Intervals
CIP	Costed Implementation Plan
CPR	Contraceptive Prevalence Rate
DHS	Demographic Health Survey
ERC	Ethics Review Committee
FP	Family Planning
HF	Health facility
HRs	Hazard Ratio
IUCD	Intrauterine Contraceptive Device (IUCD)
IUD	Intrauterine Device
LARC	Long Acting Reversible Contraceptive
MICS	Multiple Indicator Cluster Survey
NDHS	Nepal Demographic Health Survey
NHRC	Nepal Health Research Council
NGO	Non-Governmental Organization
PHCC	Primary Health Care Center
PPI	Poverty Probability Index
SARC	Short Acting Reversible Contraceptives
SDG	Sustainable Development Goals
TFR	Total Fertility Rate
WHO	World Health Organization

Executive Summary:

- A total of 1307 reproductive aged women who were eligible and agreed to participate were enrolled in the study. The final sample included 1216 women (IUCD/Copper-T: 174; Implant: 494; Injectable-Depo: 362; Oral pills: 186) who had at-least one follow-up information.
- At the end of 1-year follow up period, cumulative discontinuation rate for Injectable-Depo was 65.07%, Oral-pills was 80.57%, IUCD/Copper-T was 26.71% and Implant was 11.83%.
- The discontinuation rate (events per person-year) for Injectable-Depo was 100.42 events per 100 person-year, Oral-pills was 179.47 events per 100 person-year, IUCD/Copper-T was 32.22 events per 100 person-year and Implants was 11.74 events per 100 person-year.
- There was a strong evidence that there was a difference in survival curves between SARC methods (Depo Vs Oral pills) ($p < 0.001$) and LARC methods (IUCD/Cooper-T Vs Implants) ($p < 0.001$).
- Compared to Injectable-Depo, adjusted hazard ratio for contraceptive discontinuation for Oral-pills was 1.85 (95%CI: 1.46, 2.35), while contraceptive discontinuation rate for IUCD was 5.77 times higher (aHR: 5.77; 95%CI: 3.42, 9.73) compared to Implant.
- Women without a child (aHR: 2.00, 95%CI: 1.05, 3.79), having youngest child over 2 years of age (aHR: 1.38; 95%CI: 1.06, 1.80) and those having plan for future child (aHR: 1.37; 95% CI: 1.04, 1.82) had significantly higher rate of SARC methods discontinuation. For LARC methods, women without any child (aHR:12.83, 95%CI: 2.32, 70.99) and having youngest child above 2 years of age (aHR:1.80, 95%CI: 1.01, 3.22) significantly increased the rate of discontinuation.
- The hazard ratio for LARC discontinuation for women aged 25 years and above was nearly half (aHR:0.56, 95%CI: 0.32, 0.98) compared to those below 25 years of age. Likewise, a unit increase in PPI index increased the rate of LARC discontinuation by almost 3% (aHR: 1.03; 95%CI: 1.01, 1.05).
- The rate of contraceptive methods discontinuation among women who received FP methods from NGOs managed clinics was significantly higher for both SARCs methods (aHR: 1.47, 95%CI: 1.08, 1.98) and LARCs methods (aHR:2.31, 95%CI: 1.26, 4.24).
- The IUCD discontinuation rate was substantially higher among those who used the methods from NGO (aHR: 10.58; 95%CI: 3.57, 31.33) and Outreach sites (aHR: 19.97 ; 95%CI: 2.88, 138.42) compared to district hospital, either husband or wife away from home for more than one-month (aHR: 3.24; 95%CI: 1.21, 8.65), youngest child being 2 years or more (aHR: 8.01;

95%CI: 2.14, 29.98), who had previously visited HF's (aHR: 5.16; 95%CI: 2.00, 13.33) and experienced side-effects due to contraceptive methods (aHR: 9.26; 95%CI: 2.01, 42.55).

- Implant discontinuation rate increased with increase in wealth index (aHR: 1.06; 95%CI: 1.03, 1.09), who had used methods after recommendation from service providers or changed after counselling (aHR: 3.67; 95%CI: 1.95, 6.91) and having unfavourable experience of using FP methods (aHR: 25.63; 95%CI: 11.56, 56.82). In contrast, women of elder age (25 years or above) and husband or wife away for at-least 1 month over past 12 months (aHR: 0.38; 95%CI: 0.15, 0.92) significantly decreased likelihood of discontinuation.
- The rate of Injectables/Depo discontinuation was higher among those taking FP services from NGOs (aHR: 1.54; 95%CI: 1.06, 2.24), Bhramin/Chettri group (aHR: 1.68; 95%CI: 1.04, 2.68), husband or wife away for more than 1 month (aHR: 1.68; 95%CI: 1.26, 2.23) and having youngest child above 2 years (aHR: 1.40; 95%CI: 1.03, 1.89) and using methods after recommendation by service providers or changed after counselling (aHR: 1.55; 95%CI: 1.12, 2.16).
- Among those using Oral Pills, the hazard ratio for contraceptive discontinuation rate increased among women having 1-2 children (aHR: 1.99; 95%CI: 1.18, 3.36) compared to those with 3 or more children; not having preferred methods due to out of stock or after not being eligible (aHR: 6.56; 95%CI: 2.12, 20.23) and having unfavourable FP experience (aHR: 3.57; 95%CI: 1.56, 8.14).
- Among the SARC method users, irregular bleeding (27.7%), husband being abroad (22.8%) and intent to get pregnant (7.6%) were the most common causes of discontinuation for Depo users, while husband being abroad or away from home (31.03%) and missed taking pills (9.7%) were the most common causes of discontinuation for Oral pills.
- On other hand, irregular menstrual bleeding was the major cause of contraceptive discontinuation for both IUCD (42.3%) and Implant (32.7%) users.
- Nearly 55.13% of women informed that they solely decided for discontinuation for SARC methods compared to only 23.27% among LARC users. However, 42.82% of users had joint decision (with their husband) to discontinuation LARC method compared to 26.39% among SARC method users.
- More than half of both SARC (57.18%) and LARC (61.22) method users reported using another family planning methods after discontinuation of the current methods. Among them, nearly 46.67% of SARC users and 43.33% of LARC users relied on "withdrawal" method for discontinuation.

I. Introduction:

Each country aims to enable women and couples to make lifesaving choices, such as having desired family size, delaying motherhood, avoiding unintended pregnancies and having healthy spacing and timing of childbirths by improving access to rights-based family planning (FP) services ^[1]. FP has the potential to reduce maternal and neonatal mortality and contribute to the socioeconomic development of countries ^[2-4]. In recent decades, low-income countries have made significant progress in contraceptive prevalence and working towards achieving the Sustainable Development Goals (SDGs). Despite this, uptake of modern contraceptive is low and unmet need for contraception is still strikingly high and is unevenly distributed, in particular the poor, vulnerable, marginalized populations in developing countries ^[5].

The Government of Nepal made a commitment to FP2020 targets in March 2015 building on the National Family Planning Costed Implementation Plan (CIP) 2015 to 2020 ^[6] based on London Summit on FP ^[7]. With this, the country aims to increase demand satisfied for modern contraceptives, currently at 68.8%, Contraceptive Prevalence Rate (CPR) for modern methods, currently at 42.8% to 52% by 2020, and reduce unmet need for FP, currently at 24.0% ^[1] to 22% by 2020 which would allow the country to achieve a replacement level fertility of 2.1 births per women by 2020. Despite FP is the most cost-effective way to improve maternal health, there are several factors affecting utilization of FP services, including accessibility of FP services and health facilities, availability and capacity of service providers, availability of commodities, lack of quality and process of managing client's expectation social and cultural beliefs.

There are also significant variations in FP service use by age, geographic region, ethnicity, wealth quintile and spousal separation. According to the Nepal Multiple Indicator Cluster Survey (MICS) 2014, modern contraceptive use is 47% but 25% of women have an unmet need for contraception, with 10% requiring it for spacing and 15% requiring it for limiting ^[8]. Furthermore, unmet need is highest in the Western and Far-Western hills, adolescent girls of 15-19 years, and those from poorest families. The Nepal Demographic Health Survey (NDHS) 2011 has shown highest Total Fertility Rate (TFR) (4.9%) among Muslims, unmet need for FP at 37%, which is highest for any ethnic/caste group, and a CPR of 23%. Unmet need for FP has been estimated to be highest (47.7%) for married girls age 15-19, followed by 39% among married women age 20-24 ^[8]. Regardless of almost universal knowledge about contraception,

married adolescents (15-19 years old) has the lowest demand satisfied by modern methods among all age groups (28.9%), while their unmet need for spacing is the highest (42.9%). A primary FP program goal to reduce unmet need and unintended fertility is to improve geographic access to modern contraceptive methods. Elimination of unmet need, although is not entirely anticipated, because many women discontinue the use of contraception and become pregnant before they switch to another method or resume using the method they adopted initially and still others give up using contraception entirely remaining exposed to the risk of unintended pregnancy ^[9].

The World Health Organization (WHO) recommends waiting at least two years after delivery care attempting to conceive again because the risks for adverse health outcomes for both mothers and children are at greatest within this interval ^[10]. While, short acting reversible contraceptives (SARC) and long acting reversible contraceptive (LARCs) methods enable women and couples to cost-effectively avert unwanted pregnancy by allowing women to space and/or limit births, women have reported several reasons on FP discontinuation. Contraceptive discontinuation is defined as starting contraceptive use and then stopping for any while still at risk of an unintended pregnancy.

Discontinuation for reasons other than wanting to become pregnant can be followed by an unwanted pregnancy (that may be aborted, safely or unsafely), switching to another method, or abandonment of all contraception. On average in low and middle-income countries, within the first year of use, 9% of women discontinue using implants, 15% discontinue Intrauterine Device (IUDs), and 32% discontinue injectables. There rates are less than 40 percent of women who discontinue non-LARC modern methods in the first year, the 12 month discontinuation rate for injectables is 32 percent ^[4].

Although there are few studies which had determined LARCs discontinuation rate and factors associated ^[11-14], they primarily have adopted retrospective study design, their sample had been confined to adolescents or youths, had not included short term FP methods and not explored discontinuation outcome.

Two studies on contraceptive discontinuation have been conducted in Nepal. One small-scale study was conducted investigated factors affecting IUCD discontinuation in a few clinics in Kathmandu; it revealed that the experience of side effects was the main predictor of

discontinuation ^[15]. One longitudinal study focused on discontinuation of post-abortion SARC methods and found that among the 78% (508/654) of women who initiated a modern contraceptive method within 3 months post-abortion, the one-year contraceptive discontinuation rate was 62 per 100 person-years. Unmarried women and those not living with their husband experienced higher contraceptive discontinuation and the one-year pregnancy rate for all women was 9/100 person-years ^[16]. Furthermore, the current NDHS report does not provide separate data on dis/continuation on LARC ^[17]. Therefore, we lack evidence from client's experience about method use over time and could not generate conclusive findings on discontinuation rates, factors associated and outcome of discontinuation. As a result, nationally representative appropriately sampled study using prospective study design is needed to determine SARC and LARC discontinuation rates, factors associated and discontinuation outcome from client's perspective in Nepalese women of reproductive age group of 15-49 years.

We propose to conduct a prospective observational study with the aim of determining SARC and LARC discontinuation rates and the factors associated with method discontinuation. We also aim to assess contraceptive behavior following discontinuation.

II. Materials and methods

2.1 Study settings and sampling

A prospective cohort study was conducted among women of reproductive age group (15-49 years) who initiated any Short-acting Reversible Contraceptives or Long-acting Reversible Contraceptives from government and NGO health facilities. The participants were enrolled within a two to three-months study enrolment period. The study sites were sampled from each ecological regions of the country, i.e. Mountain, Hill and Terai region. Two districts were randomly selected from each region and from each district. From each district, one district hospital and one PHCC were randomly selected. Only one clinic and one outreach site conducted by NGO were randomly selected from two districts in each ecological region. In summary, a total of 18 study sites (6 district hospitals, 6 PHCCs, 3 NGOs run facilities and 3 Outreach clinics) were selected from 6 districts (Dolpa, Sankhwasabha, Sindhuli, Kathmandu, Siraha and Rautahat). The sampling details of selected health facilities in each ecological region is provided in annex 1.

The study population included reproductive aged women who were not using any modern FP methods within the last 3 months and receiving the SARCs (pills or injectables) or LARCs (IUCD or Implant) from the health facilities selected in the study. The detail inclusion and exclusion criteria for the study is provided in the annex 2. We excluded women who were not willing to voluntarily participate in the study and did not provide consent to receive a follow-up visits ((n=101)). In addition, women who only take up FP counselling without receiving FP service or those who take-up condom (both male or female condoms) or received permanent FP methods were also excluded from the study.

The sample size was calculated for each method (Pill, Injectable, IUCD and Implant) using anticipated discontinuation rates generated from the latest regional estimates of FP discontinuation data ^[4] with 95% confidence intervals and a 5% margin of error using a formula as provided in figure 1.

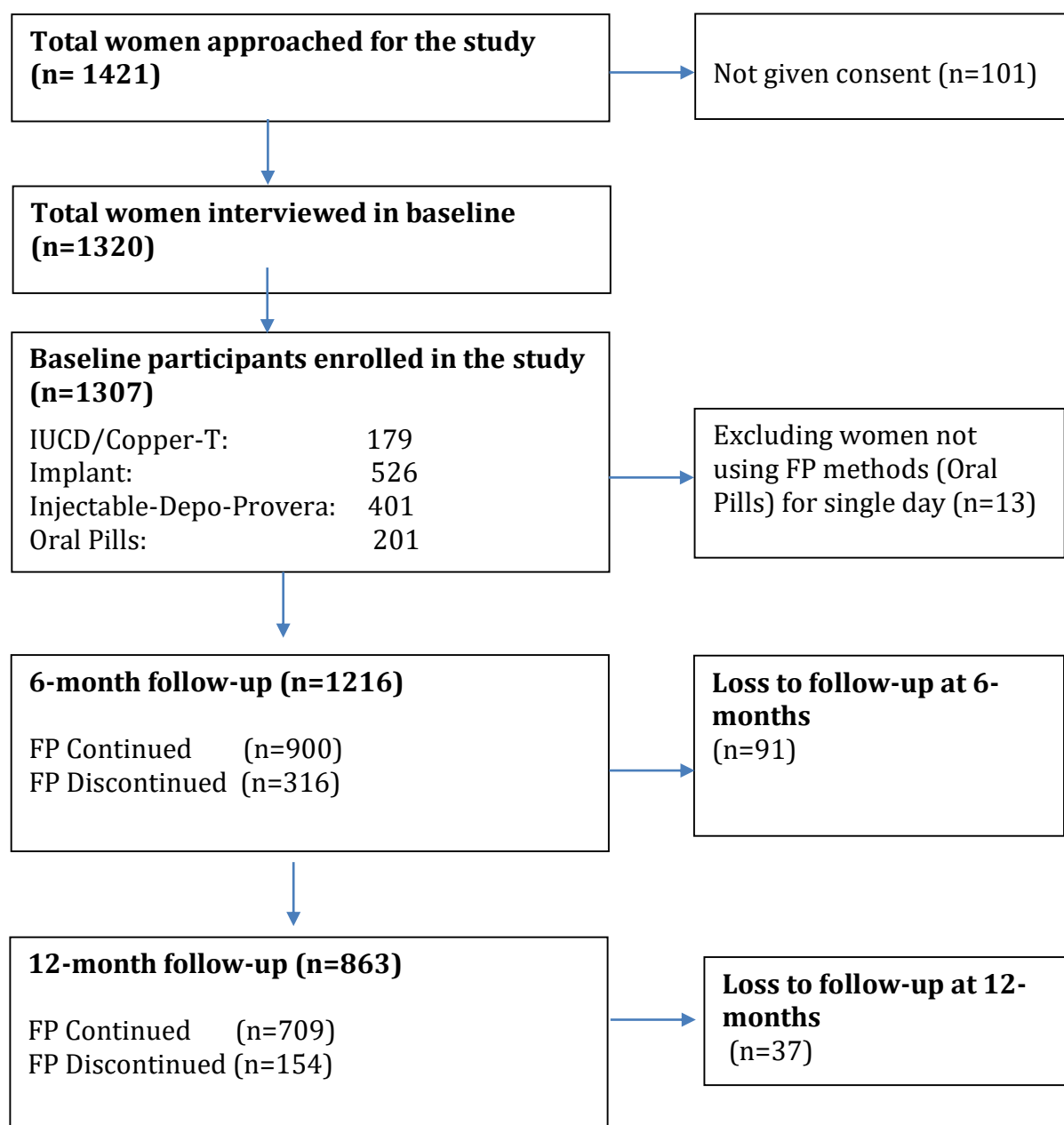
Fig 1: Sample size calculation

$n = Z^2 * p (1-p) / e^2$ <p><u>Where,</u></p> <p><i>n=sample size</i></p> <p><i>Z=1.96 for 95% confidence interval</i></p> <p><i>p= prevalence of discontinuation</i></p> <p><i>e=permissible error (5%)</i></p>

The sample size was adjusted for design effect of 1.5 for each contraceptive method and increased by 35% to account for loss to follow-up and 10% for non-response. The final sample size for the study was 2540 (Oral pills: 789; Injectable: 824; Implant: 354; IUCD: 574). The total sample size calculated for each contraceptive method which were distributed across each ecological region, i.e. Mountain, Hill and Terai based on proportion of current FP users. The sample size was further distributed by SARC and LARC method for each HF and districts per ecological region based on percentage distribution of pills, depo, IUCD and Implant among women aged 15-49 years.

A total of 1421 women were approached for the study who fulfilled the eligibility criteria and excluding participants not providing consent (n=101), the baseline interview was conducted for 1320 women. We further excluded 13 women who took pills from HFs but reported not using it for a single day, thus a total of 1307 women were enrolled in the study at the baseline. At the analysis phase, we only included 1216 women who had completed at-least one follow-up interview at 6 months. The flow-chart of the participants involved in the study is provided in the figure 2.

Fig 2: Flowchart of FP discontinuation study



The study approached the participants during usual service delivery hours between 10 am to 4:30 pm Sunday to Friday. If the client flow was normal, participants were interviewed sequentially, whereas in the FPs with heavy client flow, we used skip pattern and took random sample from them. The trained enumerators collected data using the structured questionnaires. The baseline and follow-up questionnaire were pre-tested. At the time of recruitment, structured questionnaire was administered that included sections on socio-demographic characteristics,

household decision-making, poverty index, fertility desire, history of contraception use, method currently using, and counselling.

1.2 Study methods:

2.2.1 Independent variables

The contraceptive methods (SARC and LARC) initiated by the women were the primary independent variable for this study. We also controlled for other covariates that could possibly confound the association and known to influence the outcomes demonstrated in existing literature. We used the Poverty Probability Index (PPI) (0 to 100) that illustrates likelihood of households having expenditure below a given poverty line. The lower PPI score indicating higher likelihood of being below poverty line ^[18]. The list of covariates and their definition is presented in table 1.

Table 1: Definition of explanatory variables

Variable	Definition
Ecological region	Ecological classification <ul style="list-style-type: none"> ▪ Terai ▪ Hill ▪ Mountain)
Health facility types	Types of Health facilities <ul style="list-style-type: none"> ▪ District Hospital ▪ Primary Health Care ▪ NGO run Health Facilities and ▪ Outreach site clinics
PPI Index	Index ranging from 0 to 100 calculated based on 10 questions on household characteristics and assets ownership (Continuous)
Ethnicity	Ethnic groups <ul style="list-style-type: none"> ▪ Bhramin/Chettri ▪ Hill/Terai Janajati ▪ Madeshi ▪ Muslim ▪ Hilly/Terai Dalit
Women's age category (Youth)	Women's age grouped as per definition of Youth: <ul style="list-style-type: none"> ▪ Youth (Below 25 years) ▪ Non youth (25 years and above)
Women's age at marriage	Women's age grouped based on legal age of marriage: <ul style="list-style-type: none"> ▪ 20 years and above

	<ul style="list-style-type: none"> Below 20 years (Dichotomous variable)
Women's occupation	Classification for occupation <ul style="list-style-type: none"> Unemployed/Agriculture/Unskilled Professional/Technical/Manager/Skilled/Sales & Service
Women Literacy status	Education <ul style="list-style-type: none"> Illiterate/Primary level Secondary level or above
Family size	Categorization based on size (number) of the family <ul style="list-style-type: none"> 5 or less members 6 and above members (Categorical)
Women and husband away from home for more than 1 month over past 1 year	Either women or partner/husband away from home/country for more than 1 month over past 12 months
Total living children	Categorization based on total living children <ul style="list-style-type: none"> No child 1-2 children & 3 or more children
Child's sex composition	Sex composition of the children <ul style="list-style-type: none"> No child Only girls Only boys Both sex children
Age of youngest child	Age of youngest child <ul style="list-style-type: none"> No child Below 2 years 2 years & above
Future child plan	Planning to have child in future
Family planning decision	Who makes decision for using FP methods in the family? <ul style="list-style-type: none"> Women themselves Women and Husband Women & other members
Husband approval for FP	Husband approval for FP methods use <ul style="list-style-type: none"> Approved Disapproved/Don't know
HF visit	Ever visited particular health facility before <ul style="list-style-type: none"> Yes No (Dichotomous variable)
Time to reach HF	Time required to reach HF <ul style="list-style-type: none"> Less than 30 mins 30 mins or more

	(Dichotomous variable)
FP methods used before	Ever used FP methods before
FP methods choice	How you choose FP methods? 1- Self choice 2-Provider recommended/changed after counselling 3-Out of stock/Non-eligible for methods/Other
Doubt about selected FP methods	Doubt about selected FP methods (Dichotomous variable)
Experienced side-effect	Experienced side-effect after use of FP methods ▪ Yes ▪ No
Overall experience of FP methods use	Overall experience of using FP methods ▪ Very/somewhat unfavourable ▪ Indifferent ▪ Very/somewhat favourable
Motivation of using FP methods	Fertility motivation for using FP methods ▪ Birth Limiting ▪ Birth Spacing
Quality of FP service	Quality FP service is defined as fulfilling following three criteria: ▪ Informed about range of FP methods to choose from ▪ Provided information on potential side effects of FP methods ▪ Informed about date to return for follow-up.

2.2.2 Outcome variables:

The major outcome variables were the contraceptive method discontinuation. Women were followed up at 6 months and 12 months post method provision to capture the discontinuation rates of both SARC and LARC methods and factors associated with discontinuation. At follow-up, participants were asked about their experience regarding methods use, reasons for contraceptive continuation or discontinuation, discontinuation outcome, and satisfaction with methods and use. The method use and continuation were recorded using a standard contraceptive calendar, commonly used by DHS survey but recording FP use week by week. The follow-up interview was completed either through telephone or follow-up at participant's house as preferred by participants. Special measures were adopted to minimize dropouts. Apart from phone follow-up, home visits were also made among those clients who agreed to participate in the study. The reminder calls a week before will be made to study participants to re-confirm their availability, schedule follow-up date and confirm venue of interview. At-least three attempts will be made to each participant before considering them as loss to follow-up.

2.2.3 Data analysis:

Participants who had at-least one follow-up interview (n=1216) were included in this study. The contraceptive discontinuation rate at 6 months and 1 year were estimated among women who initiated contraceptive methods after accounting for censoring. Observation time each woman contributed for the analysis was either a period until she discontinued FP methods or exit date at 12 months (after end of study) or last follow-up date if she was lost-to-follow-up between 6 (after first follow-up) and 12 months. We presented descriptive statistics (means and standard deviation) for continuous variables and frequencies for categorical variables. The comparison was made for major baseline characteristics among women who were included and those lost to follow-up (excluded) using t-test for continuous variables and chi-square test for categorical variables.

Kaplan-Meier survival curves were used to present FP discontinuation rate by methods initiated for SARC and LARC separately. We then used log-rank test to examine difference in survival distribution (methods discontinuation rate). Multivariable Cox proportional hazards models were used to estimate hazard ratios for discontinuation by methods and other covariates. We used backward elimination technique for building final model excluding covariates with significance level greater than 0.25. The Schoenfeld residuals were used to test proportional hazard assumptions. We also presented the number and percentage of women who reported particular reason for method discontinuation.

The statistical analysis was performed using Stata, version 14 (Stata Corporation, College Station, TX, USA) and p-value was set at 0.05. The ethical approval for the study was taken from Nepal Health Research Council (NHRC) and Marie Stopes International's independent Ethics Review Committee (ERC).

III. Major Findings

3.1 Comparison between women who participated and lost to follow-up

The table 2 shows the difference in baseline characteristics among women who were included in the study and lost to follow-up. Women who were lost to follow-up had higher mean PPI score, belonged to small sized family and had less number of children, more educated and more likely to be using short acting methods.

Table 2: Comparison between study participants and loss to follow-up

Characteristics	Participants (n=1216)	Lost to follow- up (n=91)	Chi-square Test (p)
Women age (mean \pmSD)*	27.9 [5.90]	26.8 [6.07]	0.07
Mean PPI score (mean \pmSD) *	61.9 [13.9]	66.7 [11.5]	0.001
Family size			
1-5 members	720 (59.2)	73 (80.2)	<0.001
6 or more members	496 (40.8)	18 (19.8)	
Women's education status			
Primary or below	542 (44.57)	52 (57.14)	0.020
Secondary or above	674 (55.43)	39 (42.86)	
Women's occupation			
Unemployed/Agriculture/Unskilled	975 (80.2)	71 (78.0)	0.62
Skilled/Sales & Service/ Professional/Technical/Manager	241 (19.8)	20 (22.0)	
Living children			
None	22 (1.8)	7 (7.7)	0.001
1-2	840 (69.1)	63 (69.2)	
3 or more	354 (29.1)	21 (23.1)	
Want to have child in future			
Yes	257 (21.1)	28 (30.8)	0.10
No	929 (76.4)	61 (67.0)	
Don't know	30 (2.5)	2 (2.2)	
Husband approval for FP methods			
Approval	1190 (97.9)	86 (94.5)	0.04
Not approved/Don't know	26 (2.1)	5 (5.5)	
Time to HF			
Within 30 mins	854 (70.2)	62 (68.1)	0.67
More than 30 mins	362 (29.8)	29 (31.9)	

Ever used FP methods			
Yes	1021 (84.0)	72 (79.1)	0.23
No	195 (16.0)	19 (20.9)	
FP methods used			
Short acting methods	548 (45.1)	54 (59.3)	0.01
Long acting methods	668 (54.9)	37 (40.7)	

*t-test p-value for difference in mean

3.2 Descriptive Statistics:

3.2.1 Demographic and baseline characteristics

Demographic and baseline characteristics of women who participated in the study is presented in table 3. More than half of the participants (50.6%) were from Terai region. Majority of the participants (69.7%) were 25 years and above and nearly 83% of them were married before 20 years.

Almost 21% women informed that they would like to have child in future and almost 98% reported having approval from husband for use of FP methods. Nearly 84% women had used FP methods before and over two thirds of women reported experiencing side effects due to use of FP methods. Limiting childbirth was the main motivation for using FP methods for 77.2% women, while 22.8% women reported for child spacing (Table 3).

Table 3: Demographic and baseline characteristics

Characteristics (n=1216)	N	(%)
Terrain		
Mountain	147	(12.1)
Hill	454	(37.3)
Terai	615	(50.6)
Type of HF		
District Hospital	356	(29.28)
PHCC	230	(18.91)
NGO	438	(36.02)
Outreach Site	192	(15.79)
Women youth age-group (years)		
25 and above	848	(69.74)
Less than 25	368	(30.26)
Caste		

Hilly/Terai Dalit	143	(11.76)
Hill/Terai Janajati	431	(35.44)
Madeshi	370	(30.43)
Muslim	30	(2.47)
Bhramin/Chettri	242	(19.90)
Women's age of marriage (year)		
Below 20	1009	(82.98)
20 and above	207	(17.02)
Women's Occupation		
Unemployed/Agriculture/Unskilled	975	(80.18)
Skilled/Sales & Service/ Professional/Technical/Manager	241	(19.82)
Women's literacy		
Primary or below/Illiterate	542	(44.57)
Some secondary and above	674	(55.43)
Either women or husband away from home for more than 1 month in last 1 year		
Yes	887	(72.94)
No	329	(27.06)
Living children		
None	22	(1.81)
1-2	840	(69.08)
3 or more	354	(29.11)
Child's sex		
No child	22	(1.81)
Only boys	397	(32.65)
Only girls	167	(13.73)
Both children	630	(51.81)
Age youngest child		
No child	22	(1.81)
Below 2 years	491	(40.38)
2 years and above	703	(57.81)
Want to have child in future		
Yes	257	(21.13)
No/Don't know	959	(78.87)
Husband approval for FP methods		
Approval	1190	(97.86)
Not approved/Don't know	26	(2.14)
Family planning decision		
Myself	278	(22.86)
Myself and Husband	852	(70.07)
Husband and other	86	(7.07)

Ever been to health facilities before		
Yes	769	(63.24)
No	447	(36.76)
Time to HF		
Within 30 mins	854	(70.23)
More than 30 mins	362	(29.77)
Ever used FP methods		
Yes	1021	(83.96)
No	195	(16.04)
Methods of choice		
Used self choice FP method	855	(70.31)
Provider recommended/Changed after counselling	333	(27.38)
Other	28	(2.30)
Experienced side-effect due to FP methods		
No side effect	381	(31.33)
Experienced side effect	835	(68.67)
Experience of FP methods use		
Unfavourable	103	(8.47)
Indifferent	356	(29.28)
Favourable	757	(62.25)
Overall FP quality (meeting all three quality criteria)		
Yes	833	(68.50)
No	383	(31.50)
Motivation for having current FP methods (n=1215)		
Birth Spacing	277	(22.80)
Birth Limiting	938	(77.20)

3.2.2 FP counselling and quality of FP service

The quality of FP service received by participants is illustrated in table 4. Majority of women informed that they were asked about fertility intentions (89.06%), informed about range of FP methods to choose from (90.05%), informed about the side-effects (92.11%), what to do if experienced any side effects (89.56%) and when to return for follow-up (80.43%) (Table 4).

Table 4: FP counselling and quality of FP service (n=1216)

Characteristics	N (%)
Provider asked for fertility intentions	
Yes	1083 (89.06)
No	133 (10.94))
Provider informed about range of FP methods to choose from	
Yes	1095 (90.05)
No	121 (9.95)
Given painkillers to take home	
Yes	608 (50.00)
No	608 (50.00)
Provider asked about method you prefer	
Yes	1149 (94.49)
No	67 (5.51)
Provider helped you to select the method	
Yes	1107 (91.04)
No	109 (8.96)
Provider provided information on potential side effects	
Yes	1120 (92.11)
No	96 (7.89)
Provider tell you what to do if you have any side effects	
Yes	1089 (89.56)
No	127 (10.44)
Provider told you when to return for follow-up	
Yes	978 (80.43)
No	238 (19.57)
Know where to go or who to contact if you have any side-effect	
Yes	1166 (95.89)
No	50 (4.11)
Overall FP quality	
Quality	833 (68.50)
Not-quality	383 (31.50)

Women were also asked about their experience of receiving FP methods from the health facilities. 82.2% women informed that they don't have any doubt regarding use of selected FP methods. Almost all women informed they would return to HFs again for taking service in future (99.8%) and recommend health facilities to other relatives (99.92%) based on their experience of FP service received from the HFs (Table 5).

Table 5: Client's experience of FP service received from HF

Characteristics	N	(%)
Information provided to you during visit to HFs		
Too little	35	(2.9)
Too much	307	(25.25)
About right	874	(71.88)
Doubts regarding use of selected FP methods		
Yes	180	(14.80)
No	1036	(85.20)
Felt confident that you know how to use the contraceptive method correctly?		
Yes	1118	(91.94)
No	98	(8.06)
Did service provider or any staff member misbehaved with you?		
Yes	11	(0.90)
No	1205	(99.1)
Given toll-free number		
Yes	406	(33.4)
No	810	(66.6)
Based on your experience today, would you return to HF for a service in future?		
Yes	1213	(99.8)
No	3	(0.3)
Based on your experience today, would you recommend HF services to your friend or relative?		
Yes	1215	(99.92)
No	1	(0.08)

Almost 8.83% of women informed that they experienced complication at the time of insertion and excessive pain was the most frequent type of complication. Nearly 94.31% women told that they know the place to remove IUCD or Implants if required. Nearly one out of five women reported they might have difficulties in reaching HFs for removal of methods and long distance to health facility was the most frequent cause (91.67%) (Table 6).

Table 6: Client's experience of FP service (IUCD and Implants)
(n=668)

Characteristics	N (%)
Complication at the time of insertion	
Yes	59 (8.83)
No	609 (91.17)
Types of complication (Multiple Response) (n=59)	
Excessive Pain	55 (93.22)
Other	3 (5.08)
Know to place to remove IUCD or Implants if needed	
Yes	630 (94.31%)
No	38 (5.69%)
Place to go for removal of FP service (n=630)	
Government Hospital	209 (33.17)
PHCC	162 (25.71)
NGO	239 (37.94)
Private Clinics	1 (0.16)
Outreach Site	19 (3.02)
Time for reaching the HF for removal of FP services	
Less than 30 mins	451 (67.51)
More than 30 mins	217 (32.49)
Difficulties on reaching HFs (n=632)	
Yes	120 (18.99)
No	512 (81.01)
Difficulties you think you will face in accessing the providers	
Distance (Too far)	110 (91.67)
Can't go alone	5 (4.17)
Other	5 (4.17)

Among the women who received SARC methods, almost all (99.8%) reported that they know the place to go or contact for having next dose/supply of contraceptive methods. Only 5.9% women reported that they face difficulties for reaching out HFs for accessing FP methods, mostly due to long distance (93.8%) (Table 7).

**Table 7: Clients experience of FP service (Pill or Injectable)
(n=548)**

Characteristics	N (%)
Know to place to go or contact to receive next dose/supply	
Yes	547 (99.8)
No	1 (0.2)
HFs for receiving next dose/supply of FP service (n=547)	
Government Hospital	140 (25.6)
PHCC	251 (45.89)
NGO	104 (19.01)
Pharmacy	30 (5.48)
Private Clinics	9 (1.65)
Others	13 (2.38)
Time for reaching the HF for receiving the next dose/supply (n=547)	
Less than 30 mins	449 (82.1)
More than 30 mins	97 (17.7)
Don't Know	1 (0.2)
Difficulties on reaching out to HF s for accessing FP methods	
Yes	515 (94.2)
No	32 (5.9)
Difficulties you think you will face in accessing the providers (n=32)	
Distance (Too far)	30 (93.8)
Can't go alone	2 (6.2)

3.3 Contraceptive discontinuation rate

Among the total women enrolled in the study (n=1216), Implant was the most commonly preferred method (40.6%), followed by Injectable-Depo (29.8%), Oral pills (15.3%) and IUCD (14.3%). The overall FP method discontinuation rate at 6 months and 12 months follow-up periods were 62.6 and 51.2 per 100 person-years (PY) respectively. Discontinuation rate was higher for SARC methods, Oral pills (178.24/100 PY) and Injectable-Depo (99.97/100 PY) compared to LARC methods, Implant (11.74/100 PY) and IUCD (32.22/100 PY) at 12 month follow-up period (Table 8).

**Table 8: Contraceptive discontinuation by methods initiated
(n=1216)**

Contraceptive methods	Initiation		Discontinuation at 6 months		Discontinuation at 12 months	
	n	(%)	n	Rate per 100 PY (95%CI)	n	Rate per 100 PY (95%CI)
IUCD	174	14.3	31	41.76 (29.37, 59.39)	46	32.22 (24.13, 43.01)
Implant	494	40.6	18	7.63 (4.81, 12.11)	55	11.74 (9.02, 15.29)
Injectable-Depo	362	29.8	157	111.35 (95.22, 130.20)	224	100.42 (88.10, 114.47)
Oral pills	186	15.3	110	204.59 (169.72, 246.63)	145	179.47 (152.52, 211.20)
Total	1216	100%	316	62.60 (56.06, 69.89)	470	51.36 (46.92, 56.22)

3.4 Kaplan-Meier survival curve

Kaplan-Meier survival curves illustrating probability of FP method discontinuation for all FP methods (fig 3), FP types (LARC methods Vs SARC methods) (fig 4), SARC methods (Oral Pills Vs Injectable Depo) (fig 5) and LARC methods (Implant Vs IUCD) (fig 6) are presented below.

Using the log-rank test, we also found a strong evidence ($p < 0.001$) of significant differences in survival curves for FP discontinuation between the all contraceptive methods, FP types, SARC methods and LARC methods.

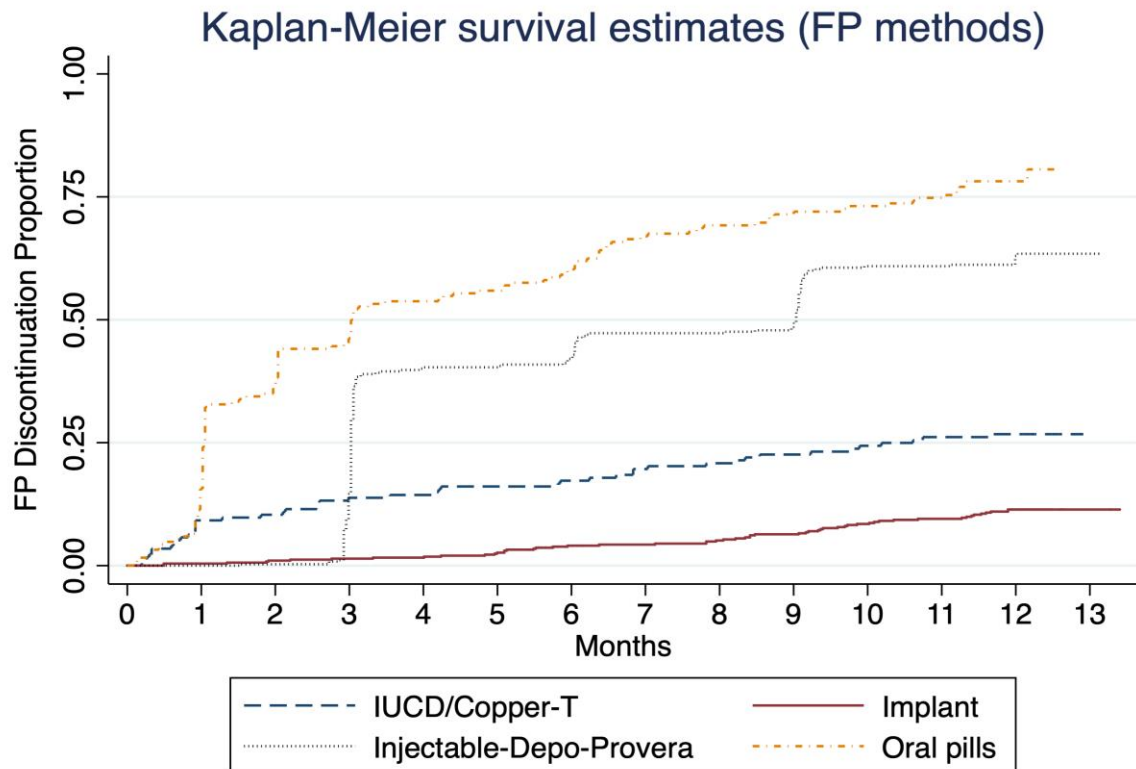


Fig 3. Kaplan-Meier survival estimates for contraceptive discontinuation (n=1216)

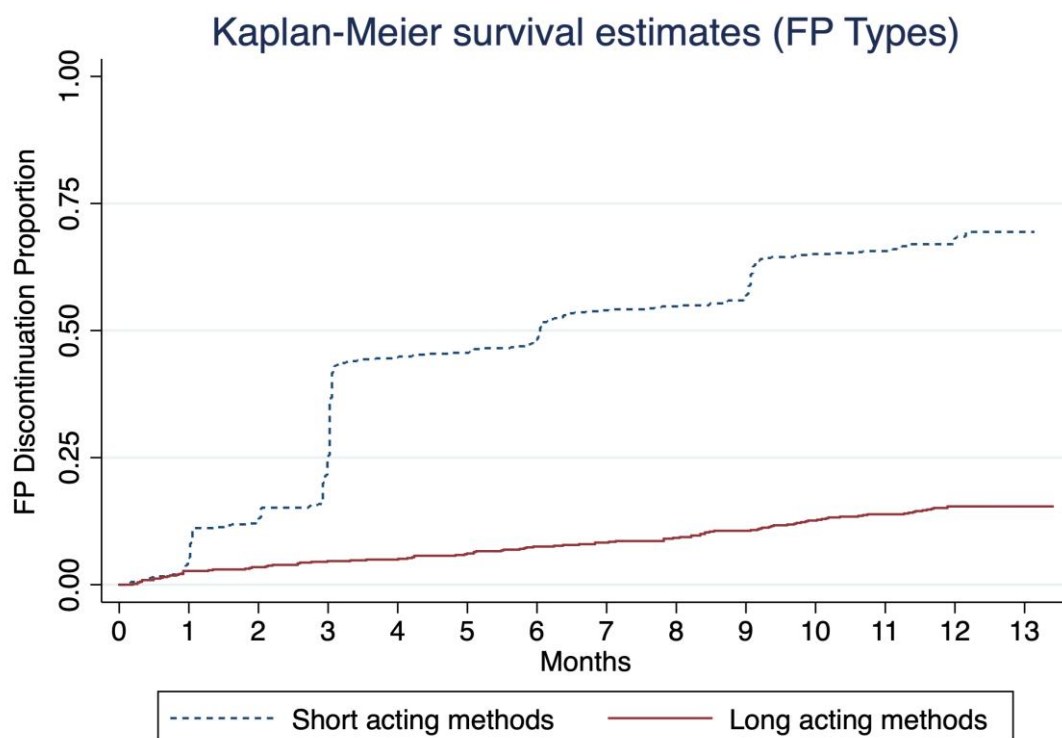


Fig 4. Kaplan-Meier survival estimates by contraceptive types (n=1216)

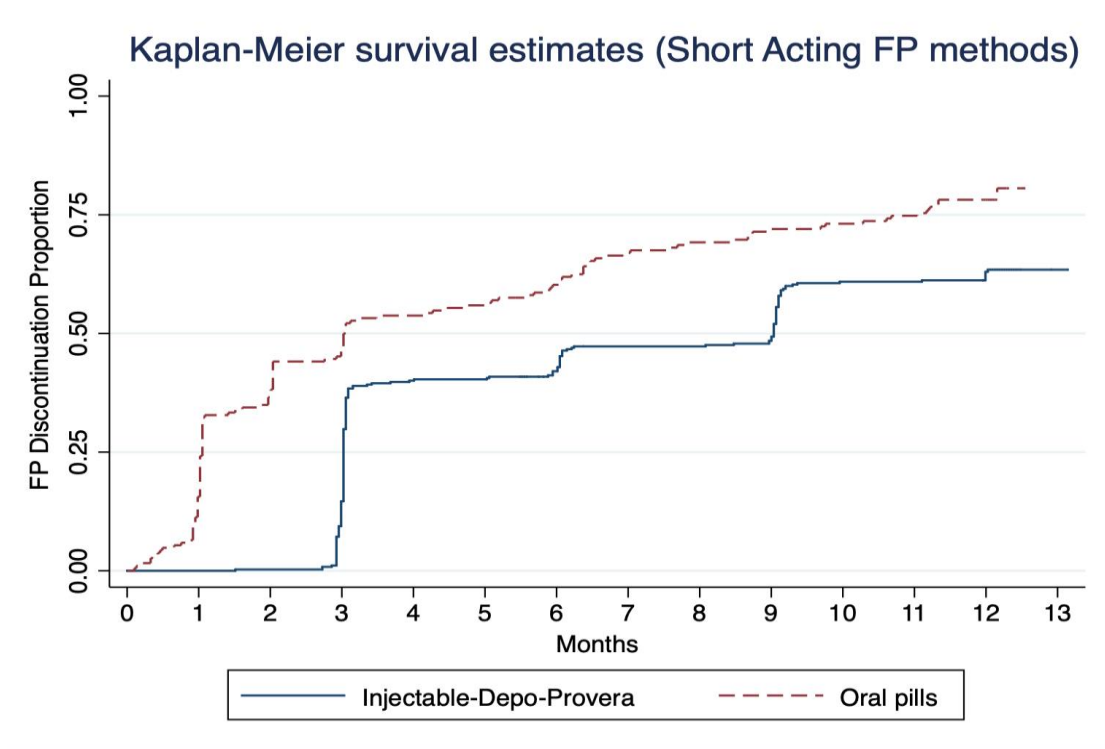


Fig 5. Kaplan-Meier survival estimates for SARC methods discontinuation(n=548)

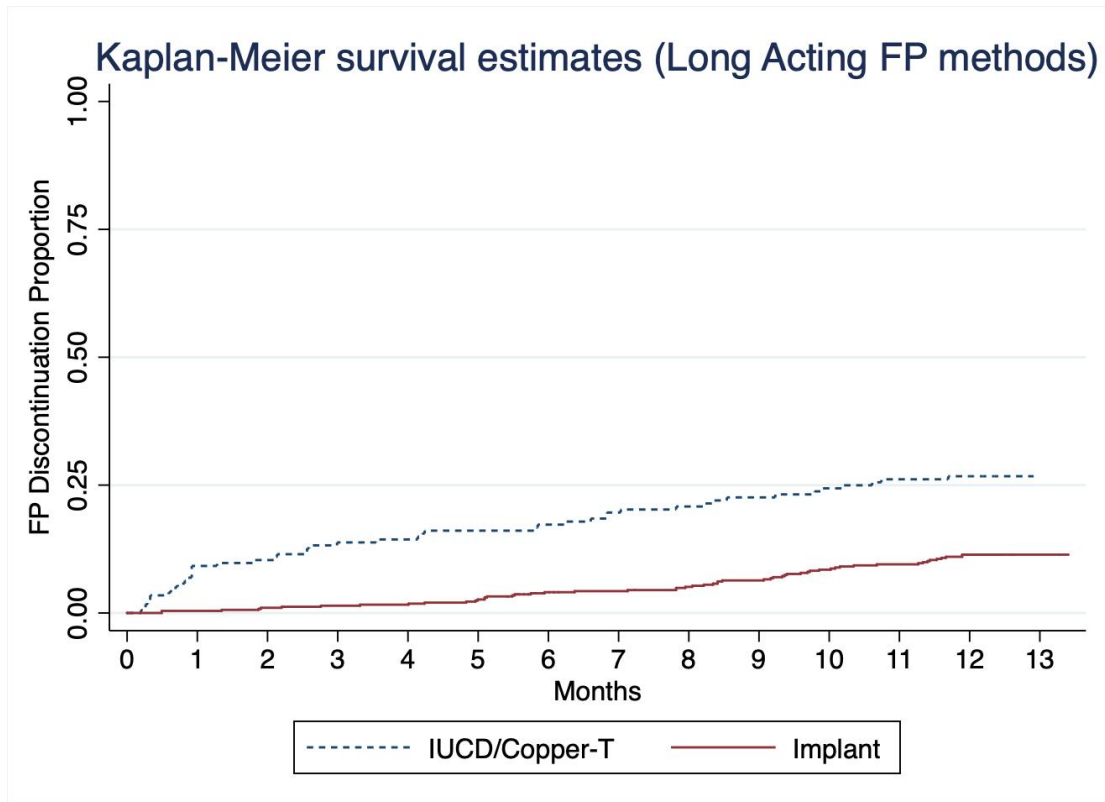


Fig 6. Kaplan-Meier survival estimates for LARC methods (n=668)

3.5 Cox Proportional Hazards Analysis:

3.5.1 Cox proportional hazards analysis for SARC methods:

The result of the Cox proportional hazards analysis for SARC presenting both unadjusted and adjusted Hazard Ratio (aHR) is illustrated in table 9.

Compared to women using Injectable-Depo, women who used Oral Pills (aHR: 1.85, 95%CI: 1.46, 2.35) had significantly higher rate of method discontinuation. Women who took the FP service from NGO run health facilities were more likely to discontinue contraceptive methods (aHR: 1.47, 95%CI: 1.08, 1.98) compared to taking methods from district hospitals. Likewise, women who reported either them or their husband being away from home for more than 1 month (aHR: 1.42, 95%CI: 1.14, 1.77) over past 1 year were significantly more likely to discontinue SARC methods (Table 9).

As compared to women having 3 or more children, women without any child were nearly twice more likely to discontinue SARC methods (aHR: 2.00, 95%CI: 1.05, 3.79). Likewise, women with the youngest child aged 2 years and above (aHR: 1.38; 95%CI: 1.06, 1.80) and having future plan for a child (aHR: 1.37; 95% CI: 1.04, 1.82) also higher SARC methods discontinuation rate.

Women who had FP methods as recommended by providers or changed the methods after counselling from service providers were 30% more likely to discontinue SARC methods (aHR: 1.30; 95%CI: 1.01, 1.68). Whereas, not using the preferred FP methods due to out of stock or non-eligible for originally preferred methods or due to other reasons significantly increased the risk of SARC methods discontinuation (aHR: 3.67; 95%CI: 2.00, 6.75) compared to those who had their chosen FP methods. Participants who expressed their FP experience as “Very/Somewhat unfavourable” (aHR: 2.70; 95%CI: 1.88, 3.88) and “Indifferent (aHR: 1.65; 95%CI: 1.29, 2.12)” were more likely to discontinue SARC methods compared to those who informed their experience as “Very/Somewhat favourable” (Table 9).

Table 9: Cox regression model (Hazard ratio) for short-acting reversible contraceptive (n=548)

Characteristics	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
FP methods		
Oral Pills	1.85 (1.51, 2.29)***	1.85 (1.46, 2.35)***
Injectable-Depo	1	1
Ecological region		
Terai	1.33 (0.98, 1.80)	
Hill	1.10 (0.78, 1.55)	
Mountain (ref)		
Health Facility Type		
PHCC	0.99 (0.76, 1.32)	1.01 (0.75, 1.37)
NGO	1.49 (1.156 1.92)**	1.47 (1.08, 1.98)*
Outreach site	0.45 (0.14, 1.42)	0.67 (0.21, 2.17)
District hospital (ref)	1	1
PPI Index	1.00 (0.99, 1.01)	0.99 (0.98, 1.01)
Ethnicity		
Bhramin/Chettri	1.31 (0.93, 1.87)	1.41 (0.96, 2.08)
Hill/Terai Janajati	0.90 (0.65, 1.25)	0.86 (0.60, 1.24)
Madeshi	1.04 (0.75, 1.44)	0.87 (0.61, 1.24)
Muslim	1.37 (0.71, 2.63)	1.14 (0.58, 2.25)
Dalit (ref)	1	1
Women age		
25 years & Above	1.02 (0.82, 1.26)	1.23 (0.92, 1.65)
Below 25 years	1	1
Age at marriage		
>=20 years	0.77 (0.58, 1.04)	0.68 (0.48, 0.95)
< 20 years	1	1
Women Occupation		
Professional/Technical/Manager Skilled/Sales & Service	1.09 (0.85, 1.41)	
Unemployed/Agriculture/Unskilled	1	
Women Literacy		
Some secondary and above	1.22 (0.99, 1.51)	1.26 (0.96, 1.66)
Illiterate/ Primary & below	1	1
Family size		
6 or more	0.80 (0.65, 0.99)*	0.81 (0.63, 1.04)
5 or less	1	1

Women or husband away from home for more than 1 month		
Yes	1.43 (1.16, 1.76)**	1.42 (1.14, 1.77)**
No (Ref)	1	1
Total Living children		
No child	3.10 (1.89, 5.10)***	2.00 (1.05, 3.79)*
1-2 children	1.15 (0.89, 1.47)	1.26 (0.91, 1.75)
3 or more children	1	1
Child's sex composition		
No child	2.86 (1.78, 4.57)***	
Only girls	1.02 (0.76, 1.38)	
Only boys	1.04 (0.83, 1.31)	
Both children	1	
Age of youngest child		
No child	3.41 (2.12, 5.49)***	1 (Omitted)
2 years and above	1.39 (1.12, 1.73)**	1.38 (1.06, 1.80)*
Below 2 years	1	1
Future child plan		
Yes	1.35 (1.09, 1.68)**	1.37 (1.04, 1.82)*
No	1	1
FP Decision making		
Other FP members	1.02 (0.66, 1.56)	
Self and Husband	0.85 (0.67, 1.09)	
Self	1	
Husband approval for FP methods		
Disapproval/Don't know	1.30 (0.64, 2.62)	
Approval	1	
Ever been to this HF before		
Yes	0.76 (0.61, 0.94)*	
No	1	
Time to reach HF		
More than 30 mins	1.28 (1.03, 1.59)*	1.09 (0.85, 1.39)
Below 30 mins	1	1
Ever used any FP methods		
Yes	1.00 (0.77, 1.30)	0.75 (0.55, 1.03)
No	1	1
FP methods choice		
Out of stock/Non-eligible for methods/Other	3.07 (1.76, 5.38)***	3.62 (1.97, 6.66)***
Providers recommended/ Changed after counselling	1.78 (1.43, 2.20)***	1.30 (1.01, 1.68)*
Self choice FP method	1	1

Doubt about use of selected FP methods		
Yes	1.11 (0.82, 1.50)	1.12 (0.81, 1.55)
No	1	1
Experienced side-effect		
Yes	0.85 (0.69, 1.04)	
No	1	
FP experience		
Very/somewhat unfavourable	1.98 (1.43, 2.74)	2.70 (1.88, 3.88)**
Indifferent	1.45 (1.16, 1.81)	1.65 (1.29, 2.12)*
Very/Somewhat favourable	1	
Motivation for FP methods		
Birth limiting	0.79 (0.64, 0.98)*	
Birth spacing	1	
FP quality service		
Adequate	0.95 (0.75, 1.21)	
Not adequate	1	

*p<0.05; **p<0.01; ***p<0.001

3.5.2 Cox proportional hazards analysis for LARC methods:

We also modelled the Cox proportional hazards for LARC methods as shown in table 10. Women using the IUCD methods were more likely to discontinue the methods (aHR: 5.77; 95%CI: 3.42, 9.73) compared to those using Implants. Women who received the LARC methods from NGO based facilities significantly increased the probability of discontinuation (aHR: 2.31; 95%CI: 1.26, 4.24) compared to women receiving service from district HFs (Table 10).

Higher PPI index also significantly increased the risk of LARC method discontinuation, a unit increase in PPI index increased the risk of discontinuation by almost 3% (aHR: 1.03; 95%CI: 1.01, 1.05). In comparison to women aged below 25 years, women aged 25 years or above were nearly half less likely to discontinue LARC methods (aHR: 0.56; 95%CI: 0.32, 0.98). In contrast, a likelihood of LARC methods discontinuation almost doubled (aHR: 1.99; 95%CI: 1.16, 3.41) for women having 6 or more members in their family compared to families with 5 or less members. In addition, having no child (aHR: 12.83; 95%CI: 2.32, 70.99) and having youngest child over 2 years (aHR: 1.80; 95%CI: 1.01, 3.22) significantly increased the likelihood of LARC methods discontinuation (Table 10).

LARC methods discontinuation reduced by more than half among women who had used FP methods before (aHR: 0.49; 95%CI: 0.24, 0.98) compared to those who had never used FP methods before. Women using methods as recommended by providers or changed after counselling were twice likely (aHR: 1.92; 95%CI: 1.18, 3.13) to discontinue LARC methods (Table 10).

Women who reported having side effect of LARC methods were nearly 6.75 times (95%CI: 2.79, 16.35) more likely to discontinue the methods compared to those who did not experienced any side effects. Similarly, women who reported having “very or somewhat unfavourable” (aHR: 19.61; 95%CI: 10.97, 35.07) and “Indifferent” (aHR: 2.47; 95%CI: 1.48, 4.11) experiences with LARC methods also had significantly higher rate of methods discontinuation (Table 10).

Table 10: Cox regression model (Hazard ratio) for long-acting reversible contraceptive (n=668)

Characteristics	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
FP methods		
IUCD/Copper-T	2.72 (1.84, 4.03)***	5.77 (3.42, 9.73)***
Implant	1	1
Ecological region		
Terai	1.42 (0.67 2.99)	
Hill	1.10 (0.51, 2.34)	
Mountain (ref)		
Health Facility Type		
PHCC	1.16 (0.52, 2.57)	2.10 (0.85, 5.19)
NGO	2.08 (1.28, 3.39)**	2.31 (1.26, 4.24)**
Outreach site	0.91 (0.50 1.65)	1.43 (0.67, 3.05)
District hospital (ref)	1	1
PPI Index	1.01 (0.99, 1.03)	1.03 (1.01, 1.05)**
Ethnicity		
Bhramin/Chettri	1.59 (0.68, 3.71)	0.89 (0.34, 2.24)
Hill/Terai Janajati	1.07 (0.47, 2.44)	0.70 (0.29, 1.70)
Madeshi	2.06 (0.92, 4.61)	1.05 (0.44, 2.48)
Muslim	3.13 (0.92, 10.70)	2.67 (0.69, 10.33)
Dalit (ref)	1	1
Women age		
25 years & Above	0.59 (0.39, 0.89)*	0.56 (0.32, 0.98) *

Below 25 years	1	1
Age at marriage		
>=20 years	0.68 (0.38 1.22)	
< 20 years	1	
Women Occupation		
Professional/Technical/Manager Skilled/Sales & Service	1.31 (0.83, 2.05)	
Unemployed/Agriculture/Unskilled	1	
Women Literacy		
Some secondary and above	1.13 (0.76, 1.67)	0.82 (0.51, 1.31)
Illiterate/ Primary & below	1	1
Family size		
6 or more	1.10 (0.74, 1.63)	1.99 (1.16, 3.41)*
5 or less	1	1
Women or husband away from home for more than 1 month		
Yes	0.74 (0.44, 1.25)	0.63 (0.36, 1.11)
No (Ref)	1	1
Total Living children		
No child	9.96 (2.38, 41.63)**	
1-2 children	0.91 (0.60, 1.37)	
3 or more children	1	
Child's sex composition		
No child	11.69 (2.83, 48.25)**	
Only girls	1.17 (0.63, 2.19)	
Only boys	1.28 (0.83, 1.96)	
Both children	1	
Age of youngest child		
No child	12.7 (3.05, 53.38)***	12.83 (2.32, 70.99)**
2 years and above	1.35 (0.89, 2.04)	1.80 (1.01, 3.22) *
Below 2 years	1	1
Future child plan		
Yes	1.71 (1.06, 2.77)*	
No	1	
FP Decision making		
Other Family members	1.00 (0.47, 2.13)	
Self and Husband	0.76 (0.49, 1.19)	
Self	1	
Husband approval for FP methods		
Disapproval/Don't know	1.73 (0.64, 4.70)	2.08 (0.70, 6.14)

Approval	1	1
Ever been to this HF before		
Yes	0.71 (0.48, 1.06)	
No	1	
Time to reach HF		
More than 30 mins	1.48 (0.99, 2.22)	1.31 (0.83, 2.06)
Below 30 mins	1	1
Ever used any FP methods		
Yes	0.94 (0.54, 1.66)	0.49 (0.24, 0.98)*
No	1	1
FP methods choice		
Out of stock/Non-eligible for methods/Other	1.78 (0.56, 5.68)	2.14 (0.63, 7.20)
Providers recommended/ Changed after counselling	1.85 (1.23, 2.79)**	1.92 (1.18, 3.13)**
Self choice FP method	1	1
Doubt about use of selected FP methods		
Yes	0.87 (0.50, 1.51)	
No	1	
Experienced side-effect		
Yes	4.78 (2.09, 10.91)***	6.75 (2.79, 16.35)***
No	1	1
FP experience		
Very/somewhat unfavourable	9.05 (5.60, 14.65)***	19.61 (10.97, 35.07)***
Indifferent	2.06 (1.30, 3.27)**	2.47 (1.48, 4.11)**
Very/Somewhat favourable	1	1
Motivation for FP methods		
Birth limiting	0.58 (0.36, 0.92)*	0.62 (0.33, 1.18)
Birth spacing	1	1
FP quality service		
Adequate	1.33 (0.89, 2.02)	0.60 (0.34, 1.03)
Not adequate	1	1

*p<0.05; **p<0.01; ***p<0.001

The results of Cox proportional hazard analysis demonstrating adjusted hazard ratio for specific contraceptive methods are presented in table 11. The adjusted hazard ratio for IUCD discontinuation increased substantially among those accessing service from NGOs (aHR: 10.58; 95%CI: 3.57, 31.33) and Outreach sites (aHR: 19.97 ; 95%CI: 2.88, 138.42), either husband or wife away from home for more than 1 month (aHR: 3.24; 95%CI: 1.21, 8.65),

having child 2 years and above (aHR: 8.01; 95%CI: 2.14, 29.98), previously visited current HF's (aHR: 5.16; 95%CI: 2.00, 13.33) and experienced side-effects due to the methods (aHR: 9.26; 95%CI: 2.01, 42.55) (Table 11).

Adjusted hazard ratio for Implant discontinuation rate increased with wealth (PPI Index) (aHR: 1.06; 95%CI: 1.03, 1.09), family size with 6 or members (aHR: 4.15; 95%CI: 2.03, 8.44) and using contraceptive methods recommended by service providers or changed after counselling (aHR: 3.67; 95%CI: 1.95, 6.91) and having unfavourable experience of using FP methods (aHR: 25.63; 95%CI: 11.56, 56.82). In contrast, husband or wife being away for 1 month or more (aHR: 0.38; 95%CI: 0.15, 0.92) and women aged 25 years or above (aHR: 0.48; 95%CI: 0.25, 0.93) decreased likelihood of contraceptive discontinuation (Table 11).

The adjusted hazard ratio for Injectables/Depo discontinuation increased among users from NGOs (aHR: 1.54; 95%CI: 1.06, 2.24), Bhramin/Chettri group (aHR: 1.68; 95%CI: 1.04, 2.68), husband or wife away for more than 1 month (aHR: 1.68; 95%CI: 1.26, 2.23), having youngest child 2 years and above (aHR: 1.40; 95%CI: 1.03, 1.89), using contraceptive methods recommended by service providers or changed after counselling (aHR: 1.55; 95%CI: 1.12, 2.16) (Table 11).

Likewise, for the Oral Pills users, the hazard ratio for contraceptive discontinuation increased among women having 1-2 children (aHR: 1.99; 95%CI: 1.18, 3.36) and having unfavourable experience for using chosen method (aHR: 3.57; 95%CI: 1.56, 8.14) (Table 11).

Table 11: Cox regression (adjusted Hazard ratio) for method specific discontinuation

Characteristics	Adjusted HR (95% CI)			
	IUCD (n=174)	Implant (n=494)	Injectables (n=362)	Pills (n=186)
Ecological region				
Terai				1.60 (0.83, 3.06)
Hill				1.32 (0.64, 2.70)
Mountain (ref)				1
Health Facility Type				
PHCC	5.03 (0.97, 26.20)		1.03 (0.70, 1.51)	
NGO	10.58 (3.57, 31.33)***		1.54 (1.06, 2.24)*	
Outreach site	19.97 (2.88, 138.42)**		0.39 (0.05, 2.88)	
District hospital (ref)	1		1	
PPI Index		1.06 (1.03, 1.09)***	0.99 (0.98, 1.00)	
Ethnicity				
Bhramin/Chettri	3.69 (0.81, 16.81)		1.68 (1.04, 2.68)*	1.27 (0.58, 2.80)
Hill/Terai Janajati	0.80 (0.18, 3.63)		1.01 (0.65, 1.57)	0.76 (0.39, 1.49)
Madeshi	0.90 (0.21, 3.90)		0.94 (0.61, 1.45)	0.75 (0.40, 1.42)
Muslim	33.60 (5.15, 219.13)***		0.52 (0.12, 2.19)	0.94 (0.31, 2.87)
Dalit (ref)	1		1	1
Women age				
25 years & Above		0.48 (0.25, 0.93)*		1.48 (0.93, 2.34)
Below 25 years (ref)		1		1
Age at marriage				
>=20 years	0.26 (0.75, 0.92)*		0.64 (0.43, 0.96)*	
< 20 years (ref)	1		1	
Women Occupation				
Professional/Technical/ Manager/Skilled/Sales & Service	2.03 (0.70, 5.87)			
Unemployed/Agriculture/ Unskilled (ref)	1			
Women Literacy				
Some secondary and above	0.56 (0.26, 1.22)		1.23 (0.88, 1.73)	
Illiterate/ Primary & below (ref)	1		1	
Family size				
6 or more		4.15 (2.03, 8.44)***	0.81 (0.59, 1.12)	
5 or less (ref)		1	1	
Women or husband away from home for more than 1 month				
Yes	3.24 (1.21, 8.65)*	0.38 (0.15, 0.92)*	1.68 (1.26, 2.23)***	
No (Ref)	1	1	1	
Total Living children				
No child		Omitted	Omitted	
1-2 children		0.38 (0.17, 0.89)*	1.28 (0.85, 1.92)	1.99 (1.18, 3.36)*
3 or more children (ref)		1	1	1
Child's sex composition				
No child		9.60 (1.78, 51.76)**		(Omitted)

Only girls	1.53 (0.28, 8.20)	1.51 (0.56, 4.08)		1.03 (0.50, 2.12)
Only boys	2.13 (0.88, 5.16)	2.22 (0.99, 4.97)		0.75 (0.45, 1.24)
Both children (ref)	1	1		1
Age of youngest child				
2 years and above	8.01 (2.14, 29.98)**		1.40 (1.03, 1.89)*	1.14 (0.72, 1.80)
Below 2 years (ref)	1		1	1
Future child plan				
Yes			1.69 (0.74, 3.89)	1.60 (0.95, 2.69)
No (ref)			1	1
FP Decision making				
Other FP members	0.26 (0.02, 3.09)			
Self and Husband	0.48 (0.20, 1.16)			
Self (ref)	1			
Husband approval for FP methods				
Disapproval/Don't know	3.25 (0.47, 22.30)	2.47 (0.53, 11.57)		
Approval (ref)	1	1		
Ever been to this HF before				
Yes	5.16 (2.00, 13.33)**	0.68 (0.37, 1.25)		
No (ref)	1	1		
Time to reach HF				
More than 30 mins		1.27 (0.65, 2.50)	1.15 (0.84, 1.58)	1.29 (0.89, 1.88)
Below 30 mins (ref)		1	1	1
Ever used any FP methods				
Yes	0.93 (0.02, 0.36)**			0.66 (0.34, 1.26)
No (ref)	1			1
FP methods choice				
Out of stock/Non-eligible for preferred methods/Other		3.01 (0.61, 14.82)	1.70 (0.68, 4.23)	6.56 (2.12, 20.23)**
Providers recommended/ Changed after counselling		3.67 (1.95, 6.91)***	1.55 (1.12, 2.16)**	1.21 (0.82, 1.79)
Self choice FP method (ref)		1	1	1
Doubt about use of selected FP methods				
Yes		1.27 (0.65, 2.50)		1.47 (0.79, 2.73)
No (ref)		1		1
Experienced side-effect				
Yes	9.26 (2.01, 42.55)**			
No (ref)	1			
FP experience				
Very/somewhat unfavourable	107.80 (28.66, 405.41)***	25.63 (11.56, 56.82)***	2.49 (1.65, 3.78)***	3.57 (1.56, 8.14)**
Indifferent	8.90 (2.76, 28.63)***	2.60 (1.32, 5.11)**	1.43 (1.02, 2.00)*	1.90 (1.23, 2.94)**
Very/Somewhat favourable (ref)	1	1	1	1
Motivation for FP methods				
Birth limiting	0.18 (0.03, 0.94)*		1.39 (0.62, 3.12)	
Birth spacing (ref)	1		1	
FP quality service				
Adequate	3.76 (0.64, 21.98)	0.48 (0.27, 0.87)*		0.77 (0.50, 1.17)
Not adequate (ref)	1	1		1

*p<0.05; **p<0.01; ***p<0.001

IV. Discussion and conclusion

A cohort of 1320 reproductive aged women were enrolled in this study. Among them 1216 women who had at-least one follow-up data were included in the final analysis. The study examined the contraceptive discontinuation rate at 6 months and 12 months follow-up periods. The study also analysed the factors associated with discontinuation of both SARC and LARC methods.

4.1 SARC and LARC methods discontinuation rate

The cumulative discontinuation rate was 65.07% for Injectable-Depo and 80.57% for Oral-pills at 12 months follow-up period. Almost 48.74% women discontinued using Oral-pills and nearly 40% discontinued Injectable-Depo within 3 months of initiation (Fig 5). The fact that women discontinued using SARC methods relatively early in the study, the discontinuation rate (per person-year) was high, 179.47 events per 100 person-year for Oral pills and 100.42 events per 100 person-year for Injectable-Depo (Table 7). The cumulative discontinuation rate for LARC methods was relatively lower compared to SARC methods. Approximately, 26.71% and 11.83% women discontinued using IUCD and Implants respectively at the end of 12-months follow-up period. The relatively higher number of IUCD users discontinued the methods within 1-month period, around 9.2%, compared to only 0.4% for Implants during the same period (Fig 6). Overall discontinuation rate (per person-year) for IUCD was 32.22 events per 100 person-years and Implants was 11.74 events per 100 person-years.

4.2 Factors associated with methods discontinuation:

Using the Cox regression proportional hazard models, we also analysed the factors associated with discontinuation separately for SARC and LARC methods. The hazard ratio for contraceptive discontinuation was 85% higher for Oral pills compared to Injectable-Depo (Table 8). Likewise, compared to Implants, the hazard ratios for contraceptive discontinuation was 5.77 times higher for IUCD methods.

On other hand, quite surprisingly, women who received contraceptive methods from clinics managed by NGOs had higher discontinuation rates compared to district hospitals. The results are consistent for both SARCs methods (aHR: 1.47, 95%CI: 1.08, 1.98) and LARCs methods (aHR:2.31, 95%CI: 1.26, 4.24). Household poverty probability index was strong predictor of contraceptive discontinuation for LARC methods, a unit increase in PPI score was associated with 3% increase in hazard ratio for contraceptive discontinuation but PPI index was not significantly associated with SARC methods. Likewise, the rate of LARC methods discontinuation among women aged 25 years was nearly half (aHR: 0.56, 95%CI: 0.32, 0.98) compared to women below 25 years. Nepalese women are mostly married young ^[1] and possibly by 25 years, more women would have desired number of children who are also more likely to continue LARC methods compared to younger women (below 25 years). The children characteristics such as women with youngest child being 2 years or above increased the rate of contraceptive discontinuation for both SARC and LARC methods. However, other childhood characteristics such as having higher number of living children and plan for future child significantly increased discontinuation of SARC methods but not for LARC methods.

Health facility distance and previous service utilization practices were not associated with contraceptive discontinuation rate. However, women who reported previously using contraceptive methods significantly reduced the rate of LARC method discontinuation (aHR: 0.49, 95%CI: 0.24, 0.98) compared to those who had never used contraceptive methods, however no such pattern was observed for SARC methods.

On other hand, as compared to women who had self-choice methods, those who reported having contraceptive methods recommended by providers or changed after counselling had higher contraceptive discontinuation rate for both SARC methods (aHR:1.30, 95%CI: 1.01, 1.68) and LARC methods (aHR: 1.92, 95% CI: 1.18, 3.13). The study indicates promoting user's choice of methods could be an important strategy for continuing both short and long acting contraceptive methods.

Women's perceived experience of contraceptive methods was significantly associated with contraceptive discontinuation rate, having "very/somewhat unfavourable" experience and "indifferent" experience increased the rate of contraceptive discontinuation for both SARC and LARC methods. On the other hand, women's experience of side-effects substantially increased the rate of LARC discontinuation (aHR: 6.75; 95%CI: 2.79, 16.35) but this factor was not significant for SARC methods.

4.3 Reason for SARC method discontinuation:

The major reasons for discontinuation of Depo/Injectables are shown in table 12. Irregular mensuration bleeding was the primary reason for discontinuation of Depo (27.56%), followed by husband abroad/away from home (22.67%) (Table 12).

Table 12: Reasons for Depo Discontinuation (n=224)

Reasons	N	(%)
Irregular bleeding	62	(27.68)
Husband abroad/away from home/meets infrequently	51	(22.77)
To get pregnant	17	(7.59)
Amenorrhea	15	(6.70)
Weight gain	11	(4.91)
Missed Depo/Inconvenient/busy schedule	10	(4.46)
Methods not effective/long-acting methods	7	(3.13)
Husband opposition	7	(3.13)
Headache	6	(2.68)
Ran out of stock	5	(2.23)
Fear of side-effect	3	(1.34)
Other minor side effects*	16	(7.14)
Other reasons	15	(6.25)

*Minor side effects include mood change, dizziness, breast tenderness, ache/skin problem/Spotted bleeding/fever/joint pain/lower abdominal pain

Likewise, husband abroad or away from home (31.03%) was the major reason for discontinuation of pills and the second most frequent cause was due to “missing taking pills or inconvenient to use due to busy schedule” (9.66%). Nearly 6.90% women reported that they discontinued taking pills to get pregnant (Table 13).

Table 13: Reasons for Pills discontinuation (n=145)

Reasons	N	(%)
Husband abroad/away from home/meets infrequently	45	(31.03)
Missed Pills/Inconvenient/busy schedule	14	(9.66)
Headache	13	(8.97)
Dizziness	11	(7.59)
To get pregnant	10	(6.90)
Irregular bleeding	8	(5.52)
Mood change	7	(4.83)
Nausea	5	(3.45)
Husband opposition	4	(2.76)
Other minor side effects*	10	(6.90)
Other reasons	18	(12.41)

*Minor side effects include acne/skin problem, pain, amenorrhea, fever, weakness/Sick

4.4 Reason for LARC method discontinuation:

The major causes of IUCD discontinuation are presented in table 14. The primary causes of discontinuation were irregular menstrual bleeding (42.22%), pain (24.44%), Abscess/infection at side (6.67%) (Table 14).

Table 14: Reason for IUCD discontinuation (n=46)

Reason	N	(%)
Irregular menstrual bleeding	19	(42.30)
Pain	11	(23.91)
Abscess/infection	3	(6.52)
Husband Abroad	2	(4.35)
IUCD rupture/displaced	2	(4.35)
White discharge	2	(4.35)
Infection	1	(2.17)
Organ injury	1	(2.17)
Lower abdomen pain	1	(2.17)

Itching	1 (2.17)
Others	3 (6.52)

The table 15 illustrates major reasons for Implant discontinuation. Most women reported irregular mensuration bleeding as the main factor for discontinuation (33.33%), followed by husband being abroad (12.96%) and weight loss (7.41%).

Table 15: Reason for Implant discontinuation (n=55)

Reason	N (%)
Irregular menstrual bleeding	18 (32.73)
Husband Abroad	7 (12.73)
Weight loss	4 (7.27)
Wanted to get pregnant	3 (5.45)
Breast tenderness	3 (5.45)
Excessive bleeding	3 (5.45)
Dizziness	2 (3.64)
Pain	2 (3.64)
Mensuration stopped	2 (3.64)
Headache	1 (1.82)
Got pregnant while using a method	1 (1.82)
Abscess/infection at site of injection	1 (1.82)
My in-laws opposition	1 (1.82)
Implant expulsion	1 (1.82)
Back pain	1 (1.82)
High BP	1 (1.82)
Others	4 (7.27)

4.5 Experience for LARC methods removal

Women who had discontinued LARC were further asked about the place and experience of removing LARC methods. Almost, half of the clients removed the methods from NGOs (50.50%), which was followed by governmental hospital (22.22%) and PHCC (16.16%). Almost two thirds of women replied that removal of IUCD/Implants was very easy and travelled

to health facility within 30 mins. Majority of women informed that the travel cost for reaching HFs for LARC removal was below Rs. 100 (41.84%). More than half of the women (58.16%) informed that they did not pay for removal of the methods (Table 16).

Table 16: Experience for LARC method discontinuation

Characteristics (n=99)	N (%)
Place where you had LAR methods removed	
Private clinics	4 (4.04)
Government hospital	22 (22.22)
Private hospital	3 (3.03)
NGO	50 (50.50)
PHCC	16 (16.16)
HP	4 (4.04)
Difficulties in finding someone to remove the IUCD/IMPLANT (n=99)	
Very easy	62 (62.62)
Okay	33 (33.33)
Difficult	4 (4.04)
How far did you travelled to get to the service provider for removal? (n=99)	
30 mins	62 (62.62)
30mins - 1 hour	10 (10.10)
1-2 hours	19 (19.19)
2 hours and above	8 (8.08)
Average Travel cost for removal of LARC methods (n=98)	
No Cost	27 (27.55)
Rs. 100 or less	41 (41.84)
Rs. 101 to Rs. 500	28 (28.57)
Rs. 501 to Rs. 1000	2 (2.04)
Average Service cost for removal of the LARC methods (n=98)	
No cost	57 (58.16)
Rs. 100 or less	24 (24.49)
Rs. 101 to Rs. 500	13 (13.27)
Rs. 501 to 1000	1 (1.02)
Rs. 1001 to Rs. 3500	3 (3.06)

4.6 Decision making for contraceptive discontinuation:

Relatively higher percentage of women (55.13%) solely decided for discontinuation for SARC methods compared to only 23.27% women using LARC methods. Nearly 42.82% of LARC users informed that they decided jointly with husband for discontinuation but only 26.39% had joint decision-making for SARC methods. This indicates women were either more willing or empowered to take decision on SARC methods compared to LARC method users (Table 17).

Table 17: Discontinuation of SARC and LARC

Characteristics	SARC (n=341)	LARC (n=98)
Who suggested for method discontinuation?		
Self-Decision	188 (55.13)	23 (23.47)
I, and husband mutually	90 (26.39)	42 (42.86)
Husband	31 (9.09)	14 (14.29)
Service provider	18 (5.28)	11 (11.22)
Friend/relatives	11 (3.23)	2 (2.04)
Mother-in-laws	2 (0.59)	5 (5.10)
Other	1 (0.29)	1 (1.02)
Who made the final decision for method discontinuation?		
Self-Decision	195 (57.18)	30 (30.61)
I, and husband mutually	106 (99.71)	51 (52.04)
Husband	27 (7.92)	8 (8.16)
Service provider	11 (3.23)	6 (6.12)
Friend/relatives	1 (0.29)	1 (1.02)
Mother-in-laws	1 (0.29)	2 (2.04)

4.7 Methods switching

The study also showed that switching the contraceptive after discontinuation of the provisioned methods was high for both SARC users (57.18%) and LARC users (61.22). However, it should be noted that nearly half of women who reported using another method after discontinuation relied on “withdrawal” methods, which is generally regarded as the high risk and inefficient methods. The family planning programme could benefit from promoting more reliable and efficient methods after contraceptive discontinuation. Besides, there were also considerable proportion of women who switched from SARC to SARC methods (23.59%) and to LARC

methods (8.21%). For the LARC users, methods switching was mainly to SARC methods (25.0%) or to condoms (25.0%) (Table 18).

Table 18: Contraceptive methods switching after discontinuation

Used another contraceptive methods after discontinuation?	SARC (n=341)	LARC (n=98)
Yes	195 (57.18)	60 (61.22)
No	146 (42.82)	38 (38.78)
If yes, which methods did you switch?	(n=195)	(n=60)
Permanent methods	4 (2.05)	1 (1.67)
LARCs (Implant & IUCD)	16 (8.21)	2 (3.33)
SARCs (Injection and Pills)	46 (23.59)	15 (25.0)
Condoms	31 (15.90)	15 (25.0)
Withdrawal	91 (46.67)	26 (43.33)
Others	-	1 (1.67)

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Annexes:

Annex 1: Sampled health facilities across ecological terrains

S.N	Ecological regions	Total no. of Districts	Health Facilities randomly selected for the study					
			No. of districts	No. of district hospitals/district	PHC/district	NGO/two districts	Outreach/two districts	Total study sites
1.	Mountain	16	2	2	2	1	1	6
2	Hill	38	2	2	2	1	1	6
3	Terai	21	2	2	2	1	1	6
Total	3	75	6	6	6	3	3	18

Annex 2: Inclusion and exclusion criteria for the study

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> - Women of reproductive age (15-49 years) receiving SARCs (pills or injectable) or LARCs (IUCD or Implant) from the health facility (HF) under study - Women who were not using any modern FP methods within the last 3 months - Those who provide voluntary written consent for study participation 	<ul style="list-style-type: none"> - Women who will not be willing to voluntarily participate in the study - Women who do not provide consent to receive a follow-up visit (neither a phone call nor a home visit) - Women who take up only counselling on FP without receiving FP service - Those who take up condom (both male and female condoms)* or receive permanent FP methods



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This study was funded by UK aid from the UK Government; however, the views expressed do not necessarily reflect the UK government's official policies.