

Early Discontinuation of Long Acting Reversible Contraceptives among Married and in Union Women: A Systematic Review and Meta-analysis

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Abstract

Introduction: Despite the improvement in availability and utilization of long acting reversible contraception early discontinuation is becoming a public health concern. Significant proportion of women discontinues the service before its due date which poses a concern in the health system and its consequence may leads to failure of a program. Therefore Estimating the rate of discontinuation from the available reports and identifying the associating factors are important for designing a strategy to overcome the problem. **Methods:** The review was conducted through a systematic literature search of articles published between 1997 and 2017. Five Most known bibliographic databases and libraries: PubMed/Medline, Global Health Database, Embase, the Cochrane Library, and African Index Medicus were used. After cleaning and sorting, analysis was performed using STATA version 11. The pooled rate of early discontinuation was estimated with a random-effects model. Heterogeneity was assessed by the I² and publication bias through funnel plot. **Results:** The 22 studies that were retained for final analysis enrolled a total of 19,805 Married or in union women. Accordingly, 20% (95% CI=17-23%) of women discontinue long acting reversible contraceptives within one year of insertion. There is no significant difference in the rate of discontinuation between IUD and implant users (20.6% (SD=12.7) and 20.2% (SD=7.9)). Side effects and health concerns were main determinants for early discontinuation. **Conclusion and recommendation:** Contraceptive discontinuation rate in this meta-analysis was found to be much higher than previous studies and world health organization's report associated with adverse outcomes and inconveniences. There for appropriate counseling, follow up care and management of side effects and clients inconveniences are very important

Keywords: Family planning service; Intrauterine device; Etonogestrel; Implanon

Introduction

In the past four decades organized international and national effort has made great progress in expanding the availability and use of family planning services, reducing unmet need and addressing special needs.^[1] In 2015, 64 percent of married or in-union women of reproductive age women worldwide were using some form of contraception. Of these 57 percent used a modern method of family planning, constituting 90 percent of contraceptive users and a larger share of them are reversible long acting contraceptive users. Intra uterine device (IUD) is one of the most commonly used methods by married or in-union women worldwide, used by among 14 percent of women.^[2-4]

Advances in contraceptive technologies over the last few decades have resulted in the availability of most effective and safe long acting reversible modern contraceptives; like copper bearing and levonorgestrel-releasing IUDs and implants which are easier to insert and remove and convenient for users and effectively prevent pregnancy; they are cost-effective for programs over time, can result in substantial cost savings for governments, and contribute directly to reaching national and international health goals.^[5,6]

For many women, long-term reversible contraception is an

excellent choice.^[7,8] It is also the strategy and preferred program for world health organization and many member countries. These methods can enhance FP programs in meaningful ways if the challenges to their availability, access, and acceptability can be overcome.^[9] In countries with high fertility rate and unmet need of contraceptives, shifting towards long acting reversible contraception (LARC) is an important strategy to ensure continuity of services. It also helps to meet the need for spacing and limiting births which has the potential to prevent thousands of cases of maternal mortality further by preventing annually occurring 80 million unintended pregnancies among women who are not using contraception.^[10,11]

Despite the improvement in availability and utilization of long acting reversible contraception early discontinuation is

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becoming a major problem. Significant proportion of women discontinues the service within one year even without any side effect.^[12] According to a report based on developing countries, 13.1% of IUD users discontinue its use during the first 12 months, 26.3% within 24 months, and 36.7% by the third year of its use. The discontinuation of IUD within the first 12 months ranges from 13% to 47% and Implanon discontinuation within the first year ranges from 2% in Nigeria to 23% in UK.^[13,14]

From the available limited research it was indicated that side-effects and health concerns like irregular bleeding, lower abdominal pain, and vaginal discharge play an important role in discontinuation. While Socio-demographic variables (Level of parity or need for more children, preferred family size, sex preference, reason for use, religious concern) along with health care related variables (appointed for follow, quality of care, satisfaction, counseling) were also contributed for early discontinuation.^[15-17]

Higher discontinuation rate of long acting contraception is a public health concern; it is also failure of a program. Long acting contraceptives which designed to use for 3-12 year are cost effective only when they serve for the intended period of time. Along with their health impact the economic impact of Early discontinuation of long acting contraceptives are very high. Therefore measuring the rate of discontinuation and identifying the associating factors are important for programme planning and designing a strategy to overcome the problem.

Materials and Methods

Literature search strategy

In accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses: guidance for reporting of systematic reviews and meta analyses)^[18] guide line this systematic review was conducted through a systematic literature search of articles published between 1997 and 2017 containing information on early termination of long acting modern contraception and their associated factors among married and in union women. Five Most known bibliographic databases and libraries: PubMed/Medline, Global Health Database, Embase, the Cochrane Library, and African Index Medicus were used. Key words from Medical Subject Headings (MeSHs): long acting contraceptives, reversible contraception, Intra uterine device, implant, early termination, discontinuation were used with (AND, OR, NOT) Boolean (Search) Operators. In addition the references of each primary researches and reviews were screened and citations were uploaded into an EndNote XI library (EndNote, Carlsbad, CA, USA) and checked for duplications.

Selection /eligibility criteria

The studies included in this review were limited to publications in English language that reported long acting contraception; intrauterine device, and any type of implants and/or both for cohorts of at least 100 women who are married or in union without geographic demarcation. Also Studies were eligible regardless of design and setting provided that they fulfill the inclusion criteria. However studies reporting the overall contraceptive termination or discontinuation were excluded to avoid over reporting which is common in short acting contraceptives. The

outcome of interest was early discontinuation of long acting reversible contraception within the period of one year of use. Studies conducted in the same location during the same time period were considered as potential duplicates and therefore excluded from the analysis.

Data extraction and abstraction

The data included in this review were derived through the electronic search of published papers, titles and abstracts after filtered for potential eligibility. If needed, and wherever possible, the authors were contacted for clarifications. From each eligible research, the following information was extracted based on the preformed database (Excel, Microsoft, 2010) format: about author, study participants, studies (study design, cohort size, setting), Type of contraception, length of use, year of publication, year of study start and end, eligibility criteria, etc. All data were extracted independently and in duplicate using a standardized extraction form. Returned abstracts were reviewed and full texts retrieved if they contained relevant information. Mean way, each selected research was assessed for methodological quality and possibility of bias.

Data analysis

After cleaning and sorting the final database was exported into Stata 11.0 for analysis (Stata, College Station, TX, USA). An outcome of interest was rate of early termination before or at 12th month of use. Estimates of early discontinuation were assessed for each study and standardized mean with 95% confidence interval was used. These were calculated with a random-effects model according to the DerSimonian and Laird method.^[19] Heterogeneity was assessed by the I² and values greater than 50% considered representing significant heterogeneity. When heterogeneity between studies was found to be significant, pooled estimates were based on random-effect models and the Hedges method of pooling. Results were displayed visually in forest plots. Bias was investigated by construction of funnel plots and Analysis was performed using the 'metan' and related functions in STATA version 11 (College Station, TX).

Results

Studies included

The search initially identified 487 citations from electronic database in the form of abstract, bibliography and citation; all citations were transferred to endnote and cleaned for duplications and 93 articles were identified for full text review. Of the 93 articles reviewed in full text, 22 articles were analyzed based on the inclusion-exclusion criteria and quality assessment and 71 studies were removed prior to analysis for different reasons: 15 studies reported the finding of short acting contraceptives, 11 removed for lack of separate analysis for short acting and long acting contraception, 12 removed for reporting out come at different period (6, 24 and 36 months only), 7 overlapped with larger studies, 8 reported outcome in terms of person year of follow up, 4 studies had recruited cohorts less than 100 individuals, 9 studies were out of time period and 5 were removed for other reasons; either not specified settings [Figure 1].

Description of Findings

The 22 studies that were retained for final analysis reported

the rate of early discontinuation of long acting reversible contraception for a total of 19,805 Married or in union women, with a range of 106-6153 women in each study. These women were followed for at least a year prior to the study and the studies were published during the period 2005–2017. Of these studies 9 were cross-sectional, 1 was case study and 12 were cohort. Eleven studies assessed IUD discontinuation alone, 9 studied Implant discontinuation and 2 assessed both IUD and implant discontinuation. Ten studies were conducted in Asia, five in Africa, four in Europe, two in North America and one in Australia. Survey characteristics are described in Table 1.

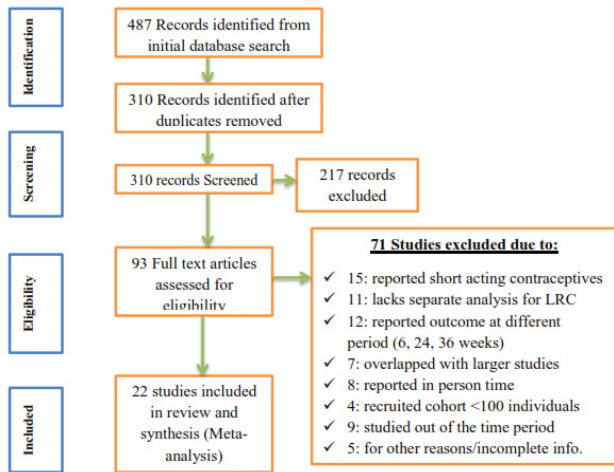


Figure 1: Flow chart for study search, selection and screening for the review.

Table 1: Characteristics of studies included in the review.						
Study	Year	Country	Design	Type	ES	SS
Sebash Tagash [20]	2012	Nepal	Retrospective Cohort	IUD	21.3	230
Azmat et al. [21]	2012	Pakistan	Cross-sectional	IUD	18	2789
Theai et al. [22]	2010	Philippines	Cross-sectional	IUD	11.2	1347
Ali Navidian et al. [23]	2016	Iran	Cross-sectional	IUD	23.85	260
O'Neil-callahan et al. [24]	2013	USA	Cohort	Both	13	6153
Carolineharvey et al. [25]	2009	Australia	Retrospective Cohort	Implant	26	976
ACQUIRE project [26]	2007	Bangladesh	Retrospective Cohort	IUD	47.3	300
Melese Seyoum [27]	2017	Ethiopia	Cross-sectional	Implant	23.9	348
Teunissen et al. [28]	2013	Netherlands	Retrospective Cohort	Implant	28	214
Anjali Agrawal [29]	2005	UK	Case study	Implant	30.2	106
Kalayu Birhane [30]	2015	Ethiopia	Cross-sectional	Implant	16	244
Nyguen TH [31]	2011	Vietnam	Retrospective Cohort	IUD	12.2	1316
Sharma et al. [32]	2014	India	Retrospective Cohort	IUD	16.8	387
Janine Barden [33]	2011	Honduras	Cross-sectional	IUD	41	671
Subha et al. [34]	2015	India	Retrospective Cohort	IUD	5.97	251
Bhatia et al. [35]	2011	India	Cross-sectional	Implant	18.5	200

N.H.Madugu et al.	2015	Nigeria	Cross-sectional	Both	25.6	625
C.Moreau et al. [36]	2009	France	Prospective Cohort	IUD	15	702
Ezagwui et al. [38]	2011	Nigeria	Retrospective Cohort	Implant	8.1	295
Adegbele et al. [38]	2008	Nigeria	Retrospective Cohort	IUD	13.9	1602
Arribas-Mir et al. [40]	2009	Spain	Cross-sectional	Implant	9	372
Otero Flores et al. [41]	2005	Mexico	Prospective Cohort	Implant	21.8	417

ES = Effect Size [Percentage of Discontinuation], SS = Sample Size, IUD = Intrauterine Contraceptive Device

For all populations, percentage of early discontinuation (with in the first year) ranged from 6% to 47.3%, with a mean of 20.3% (SD=10.2). IUD discontinuation ranged from 6% in India to 47.3% in Bangladesh with a mean of 20.6% (SD=12.7) and Implant discontinuation ranged from 8.1% in Nigeria to 30.2% in United Kingdom with a mean of 20.2% (SD=7.9). There is no significant difference in the rate of discontinuation between IUD and implant users. Only three studies reported discontinuation rate of below 10%; in India IUD discontinuation rate of 6% (95% CI=4-10%), in Nigeria implant discontinuation rate of 8% (95% CI=5-12%) and in Spain implant discontinuation rate of 9% (95% CI=6-12%). Similarly three studies reported discontinuation rate of above 30% [Figure 2].

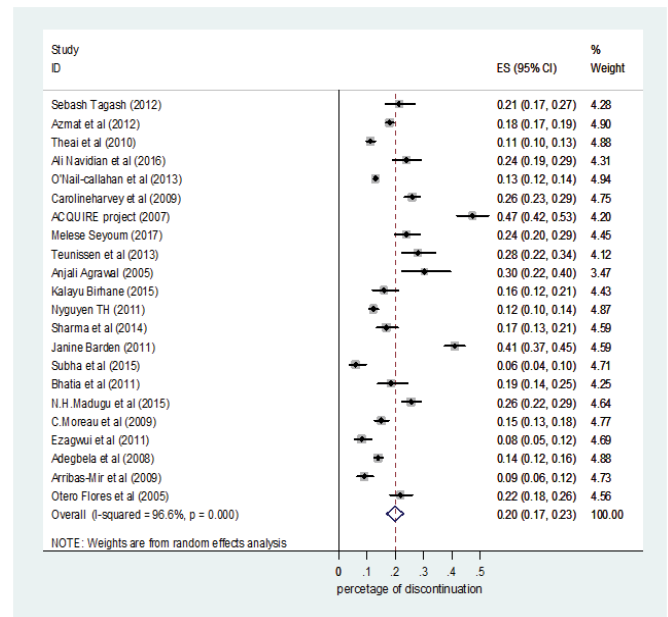


Figure 2: Forest plot showing proportion of long acting reversible contraceptive users who discontinued with in first year of use, weighted according to random-effects.

Pooled estimates and tests

Heterogeneity tests showed significant variations between studies (Q=617.8, P=0.000), where Q-value, the weighed sum of squares on a standardized scale was significantly different compared with expected weighed sum of squares and I-squared showed that 96.6% of the observed dispersions are attributed to real rather than spurious variations. Also the funnel plot showed evidence of bias with some of the studies missing at the bottom rather than around the main effect [Figure 3]. Accordingly, the

Duval and Tweedie's trim and fill test was applied to adjust for the publication bias.

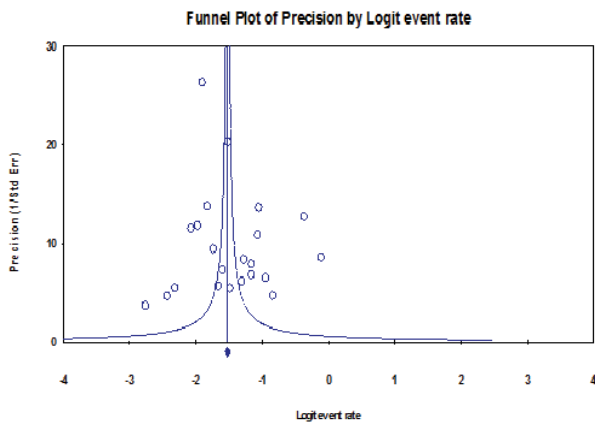


Figure 3: Funnel plot for 22 studies included in the meta-analysis.

The presence of heterogeneity and publication bias therefore resulted in adjustment of the point estimate of the percentage of discontinuation under a random effect model from 15% to 20%. In a fixed effect model the pooled estimate of discontinuation rate was 15% (95% CI=15-16%) and in a random effect model the pooled estimate of discontinuation rate became 20% (95% CI=17-23%), while estimates of each study are unchanged. In all cases pooled estimate from random effect model was used for report and discussion.

Discussion

Contraceptives are used by the majority of married or in-union women in almost all regions of the world. Modern contraceptive methods constitute most contraceptive use in the current statistics. These High levels of contraceptive prevalence reflect availability of different mixtures of methods, but long-acting reversible methods play a prominent role. Significant proportion of married or in union women prefers to use reversible long acting contraceptives.^[2-4]

All available types of contraception have both strengths and weaknesses, and no method is medically suitable, appropriate and acceptable for all couples in all circumstances. However, long acting reversible contraceptives are best preferences for most women for delaying or spacing births. Current advancements in contraceptive technology and health care system made this contraceptives to have less side effects, less failure and technically easy for insertion and removal. In order to avoid financial barriers for use many countries provide the service free of coast, which created additional opportunity.^[4,13,14]

However, since Individuals are vary in their experience of and tolerance for side effects of highly effective modern methods as well as in their willingness to tolerate the inconveniences, and ability of health professionals to provide quality service, counseling clients and appointing follow up, early discontinuation of long acting reversible contraceptives created another threat for the service. Unless the contraceptives are retained in place until their service year, all advantages of long acting reversible contraceptives: coast effectiveness and efficacy remains under question.^[8,11,13]

From previous studies it was reported that significant proportion

of mothers discontinue long acting contraception use within a short period of time. The discontinuation rate varies from country to country; however there is no estimate made based on reviewing available researches throughout the world which could estimate the overall rate of discontinuation. Therefore this study evaluated 22 researches^[20-41] and estimated the pooled discontinuation rate of long acting reversible contraception.

According to this study, 20% (95% CI=17-23%) of women discontinue long acting reversible contraceptives within one year of insertion. The rate of discontinuation in the first year in the study was higher as compared with a survey conducted among women of 14 developing countries which was 13.2%.^[13] Also in line to Mohamed Ali's report^[14] huge inter-country variations in the probability of stopping contraception use were observed, which may have contributed to the difference observed between our estimate and the survey report in developing countries.

After 12 months more than 30% of women had discontinued their contraception in the three studies. Forty seven percent (95%CI=42-47) of women in Bangladesh, 41% (95%CI=37-45) of women in Honduras and 30% (95%CI=22-40) of women in United Kingdom^[26,29,33] had discontinued their contraception with in the first year of insertion. On the other hand three studies had reported a discontinuation rate of less than 10%. Six percent (95% CI=4-10%) of women from Subha et al.^[34] report, 8% (95% CI=5-12%) of women from Ezagwui et al.^[38] report and 9% (95% CI=6-12%) of women from Arribas-Mir et al.^[40] report had discontinued their contraception within one year of insertion. This difference may be ascribed to difference in design, setting and difference in the health care system.

However, in contrast to pronounced inter-country differences, discontinuation does not vary appreciably between the two types of long acting contraception users. In the study 20.6% (SD=12.7) IUD users and 20.2% (SD=7.9) of implant users had discontinued with in the first year of insertion. Thus the methods are equally suitable and proportionally posed a side effect among women all around the world. When a method supposed to be serving for 10-12 years and implant expected to serve for 3-5 year are removed early within one year of insertion, the loss to health care system is very high.^[4,8] The other impact is when women discontinue early they may not have another alternatives for spacing which may causes unwanted pregnancy.^[13,14]

Along with socio-economic determinants planned pregnancy was reported as one of the most common reason for discontinuation of all methods of contraception. This review found that side effect ascribed to IUD and Implants like vaginal bleeding, infection, and menstrual abnormalities was the major reason for discontinuation and desire to have child, expulsion, failure and method switch contributed a lot. This finding is in line to many of previous studies conducted abroad.^[26,29,34,40]

Conclusion and Recommendation

Contraceptive discontinuation rate in this meta-analysis was found to be much higher than previous studies and world health organization's report from survey reports. This higher level of discontinuation may substantially contribute to high fertility rate, unwanted pregnancies, and induced abortions. Also early

termination of long acting contraception makes the method less cost effective. Side effects associated with the method itself and the procedure, expulsion, failure and other similar inconveniences contributed for discontinuation. There for appropriate counseling, follow up care and management of side effects along with information on contraceptive effectiveness, insertion and removal procedures are very important.

Conflict of Interest

All authors disclose that there was no conflict of interest.

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