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## GYNAECOLOGY

# Discontinuation of Contraceptive Implants within 12 Months of Use

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### ABSTRACT

**Objectives:** To assess discontinuation of the contraceptive implants within 12 months of implementation and associated factors.

**Materials and Methods:** A retrospective chart review was conducted of women who received contraceptive implants between June 2012 and June 2017. Baseline characteristics and postplacement side effects associated with implant discontinuation were assessed using t tests, $\chi^2$/Fisher's exact tests, and backwards stepwise logistic regression.

**Results:** Of 259 women, 23 (8.9%, 95% confidence interval (CI) 5.4% -12.4%) requested their devices be removed prior to 12 months of use. We found similar discontinuation rates between participants with etonogestrel implants (9/103, 8.7%) and those with levonorgestrel implants (14/156, 8.9%). The most frequently cited reasons for removal were bleeding problems (17.4%) and wanting to become pregnant (13%). The majority of women chose either no contraception or less effective methods after removal of the implant. Those women who had underlying diseases, fatigue, or other side effects during the postpartum period were more likely to remove the contraceptive implant by 12 months, independent of other factors.

**Conclusion:** Both types of contraceptive implant had excellent continuation rates. Side effects (including, but not limited to, bleeding pattern changes) were the main reason for discontinuation. Physician should emphasize the importance of switching contraceptive methods for those who discontinue the contraceptive implant but still require contraception.

**Keywords:** LARC, discontinuation, levonorgestrel, etonogestrel, implantation.

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# *การเลิกใช้ยาฝังคุมกำเนิดภายใน 12 เดือนของการใช้*

***เรืองแข ศัพท์พันธุ์, ภาณิชา วัฒนากมลชัย, ยุทธพงศ์ วีระวัฒนตระกูล, เจน โสธรวิทย์***

***บทคัดย่อ***

***วัตถุประสงค์:*** *เพื่อประเมินอัตราการเลิกใช้ยาฝังคุมกำเนิดทั้งสองชนิดภายใน 12 เดือนของการใช้ และปัจจัยที่เกี่ยวข้อง*
***วัสดุและวิธีการ:*** *การศึกษาย้อนหลังจากข้อมูลในเวชระเบียนของสตรีที่ได้รับการฝังยาคุมกำเนิดตั้งแต่เดือนมิถุนายน พ.ศ. 2555 ถึงเดือนมิถุนายน พ.ศ. 2561 โดยนำข้อมูลทั่วไปและผลข้างเคียงภายหลังการฝังยาที่เกี่ยวข้องกับการเลิกใช้ยาฝังคุมกำเนิดมาวิเคราะห์โดยใช้การทดสอบที การทดสอบไคสแควร์ การทดสอบฟิชเชอร์ และการถดถอยย้อนหลังแบบขั้นตอน*
***ผลการศึกษา:*** *อาสาสมัคร 23 ราย จาก 259 ราย (ร้อยละ 8.9) ขอให้นำยาฝังออกก่อน 12 เดือนของการใช้ ซึ่งอัตราการเลิกใช้ระหว่างผู้ใช้ยาฝังคุมกำเนิดชนิดอีโทโนเจสเตรล (ร้อยละ 8.7) และผู้ที่ใช้ยาฝังคุมกำเนิดชนิดลีโวนอร์เจสเตรล (ร้อยละ 8.9) นั้นใกล้เคียงกัน สาเหตุที่อ้างถึงบ่อยที่สุดในการเลิกใช้คือ ปัญหาเลือดออก (ร้อยละ 17.4) และต้องการตั้งครรภ์ (ร้อยละ 13) สตรีส่วนใหญ่เลือกที่จะไม่ใช้วิธีการคุมกำเนิดหรือใช้วิธีที่มีประสิทธิภาพน้อยกว่าหลังจากเลิกใช้ยาฝังคุมกำเนิด สตรีที่มีโรคประจำตัว มีอาการอ่อนเพลียหรือมีผลข้างเคียงจากยาฝังอื่นๆ และสตรีในช่วงหลังคลอดมีแนวโน้มที่จะเลิกใช้ยาฝังภายใน 12 เดือนอย่างเป็นอิสระจากปัจจัยอื่นๆ*
***สรุป:*** *ยาฝังคุมกำเนิดทั้งสองชนิดมีอัตราการคงใช้ที่ดีเยี่ยม โดยผลข้างเคียงเป็นสาเหตุหลักของการเลิกใช้ แพทย์ควรเน้นถึงความสำคัญของการเปลี่ยนไปใช้วิธีคุมกำเนิดอื่นสำหรับสตรีที่เลิกใช้ที่ยังต้องการการคุมกำเนิด*

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## Introduction

Contraceptive implants, or progestin-releasing long-acting reversible contraception (LARC), are the most effective type of removable contraception. The reported failure rate of contraceptive implants is 0.05%. Moreover, since the effectiveness of the implant is not dependent on the user's compliance, typical-use and perfect-use failure rates are highly similar[1]. Ovulation can be suppressed as early as the first day of insertion[2], and this method has a high safety profile and satisfaction rate[3]. Common adverse events associated with contraceptive implants are irregular bleeding, headache, acne, weight gain, breast tenderness, and abdominal pain[3]. Currently, there are two types of contraceptive implant available in Thailand. The main differences between the two types are the active components and duration of pregnancy prevention. Levonorgestrel (LNG)-releasing implants provide five-year protection, while etonogestrel (ENG)-releasing implants can prevent pregnancy for three years[4].

The American College of Obstetricians and Gynecologists (ACOG) has recommended LARC as a first-line contraceptive option for both adults and adolescents[5]. Although the acceptance rate is high, early discontinuation has been reported as being from 7 and 63% in various areas around the globe[6-9]. Irregular bleeding appears to be the fundamental reason behind premature removal[10]. Premature discontinuation negates the benefits of this long-acting contraception, and leads to risk of unintended pregnancy (as it occurs most often in cases in which contraception is still required)[11]. Moreover, fertility returns rapidly after removal of the contraceptive implant[12]. This leads to induced abortion that might be unsafe. Providers may thus be reluctant to recommend this form of contraception, as early removal may have negative consequences, both in terms of the woman's health and the cost-effectiveness of the contraception[13].

Although studies have been conducted on discontinuation of long-acting reversible contraceptives in various areas around the world, there are limited data available on contraceptive implant removal in Asian countries. Furthermore, most of the studies conducted in western countries focused only on the discontinuation of ENG contraceptive implants[7,14,15]. Accordingly, this study aimed to determine the 12-month discontinuation rate and factors related to discontinuation among women using contraceptive implants in Srinagarind hospital.

## Materials and Methods

### *Participants and setting*

This study was conducted in Srinagarind Hospital, a university hospital in northeast Thailand. All women who seek the family planning services there receive comprehensive counselling regarding efficacy and side effects of various methods of contraception. If a patient opts to receive a contraceptive implant and has no contraindications, insertion is performed by trained physicians. The type of implant used is chosen according to patient preference. Participants are scheduled to visit the clinic at 1 week and 12 months after insertion or whenever the patient has a serious complaint to assess any possible side effects. The retrospective chart review in this study was carried out using standard methods. Medical records of all women who had contraceptive implants inserted at the family planning clinic between June 2012 and June 2017 were assessed. The study was approved by the institutional review board of the Khon Kaen University Ethics Committee in Human Research (HE 61130).

### *Data collection*

Data collection took place in June 2018 to allow all women who participated in this study to continue their use of the contraceptive implant for at least one year. Information regarding discontinuation of the contraceptive implant within the year following the insertion was ascertained via auditing of the family planning clinic medical records or through telephone contact.

Baseline information regarding participants' age, parity, baseline status (no contraception, contraception during the postpartum period, contraception post-

abortion, or used other methods of contraception), prior contraception use, occupation, weight (kg), and height (cm) was retrieved upon placement of contraceptive implants. At the follow-up visit, women were classified into either the discontinuous group (removed the implant before 12 months) or continuous group (continued use of the implant for at least 12 months). The date of removal was recorded in order to calculate the duration of use in months. Data were documented at the time of removal regarding the reason for discontinuation, birth control plan, and side effects associated with contraceptive implants including bleeding problems (spotting, heavy bleeding, irregular menstruation and amenorrhea), dysmenorrhea, pelvic pain, leukorrhea, headache, fatigue, breast tenderness, weight gain, acne, and pain/infection at the insertion site. Data were extracted by trained research assistants.

***Statistical analysis***

The primary outcome was the discontinuation of the contraceptive implant at 12 months. Analyses were performed with Stata statistical software version 12.0. Descriptive data are expressed as percentages and frequencies. The baseline characteristics of the discontinuation group and continuation group were compared using a $\chi^2$ test or Fisher's exact test, as appropriate. Univariate analysis by Firth logistic regression was used to examine the relationships between risk factors and discontinuation of contraceptive implants before 12 months of use. According to our literature review, the covariates associated with discontinuation of implant use included age, number of children, and spotting[8,14] and the covariates with p values ≤ 0.1 in the univariate analysis were eligible for multivariable, stepwise logistic regression modeling. The precision of the adjusted odds ratio (OR) was determined using a 95% confidence interval (CI). A p value less than 0.05 was considered significant.

# Results

Among 281 women who had contraceptive implants inserted during the study period, 22 were lost to follow-up. Median follow-up duration was 12 months. Therefore, 259 participants who had follow-up data available were included in the analysis. Of these, 23 (8.9%, 95% CI 5.4% -12.4%) requested their devices be removed prior to 12 months of use. The mean duration of use among those who requested their devices be removed was 7.5 ± 3.4 months. The minimum duration was only 1 week after insertion due to fatigue.

Participants' baseline characteristics in the continuation and discontinuation groups were compared in Table 1. Their ages ranged from 11 to 48 years, with a mean age of 25.5 years. The characteristics of participants in the two groups were similar, with the exception that women in the discontinuation group were more likely to be 20 to 35 years of age (73.9% vs 52.5%) and in the postpartum period (87.0% vs 54.7%) than those in the continuation group. With regard to the type of implant used, 103 (39.8%) used ENG implants, and 156 (60.2%) used LNG implants. The rate of discontinuation prior to 12 months of use was similar in participants using both types (9/103, 8.7% vs 14/156, 8.9%).

Spotting (48.3%) and amenorrhea (39.1%) were the common side effects among implant users. However, the proportion of women who experienced bleeding in the discontinuation group was similar to that in the continuation group, regardless of pattern of bleeding. Women who developed fatigue, breast tenderness, decreased libido, and other side effects (including emotional lability, decreased appetite, and palpitation) were more likely to remove the device early than those who did not (Table 2).

The reasons for removal and contraceptive choices after removal are reported in Table 3. Wanting to become pregnant (13%), bleeding problems (17.4%), and other reasons (26.1%; including hysterectomy, weight loss, and fatigue) were most commonly cited as reasons for device removal. The majority of women (91.5%) who discontinued use of the implant chose either no contraception or less effective methods after removal.

**Table 1.** Baseline demographic and reproductive characteristics of participants in the continuation group compared to those in the discontinuation group at 12 months.

| Baseline characteristics | Total (n = 259) | Continuation group (n = 236) | Discontinuation group (n = 23) | p value[a] |
|---|---|---|---|---|
| Age at insertion (years) | | | | |
| < 20 | 81 (31.3) | 76 (32.2) | 5 (21.7) | 0.040 |
| 20-35 | 141 (54.4) | 124 (52.5) | 17 (73.9) | |
| > 35 | 37 (14.3) | 36 (15.3) | 1 (4.4) | |
| BMI (kg/m$^2$) | | | | |
| < 23 | 162 (62.6) | 151 (64.0) | 11 (47.8) | 0.931 |
| 23-30 | 78 (30.1) | 69 (29.2) | 9 (39.1) | |
| > 30 | 19 (7.3) | 16 (6.8) | 3 (13.0) | |
| Parity | | | | |
| 0 | 37 (14.3) | 36 (15.3) | 1 (4.4) | 0.361 |
| 1 | 131 (50.6) | 118 (50.0) | 13 (56.5) | |
| 2 or more | 91 (35.1) | 82 (34.8) | 9 (39.1) | |
| Status at baseline | | | | |
| No contraception | 44 (17.0) | 43 (18.2) | 1 (4.4) | 0.023 |
| Postpartum period | 149 (57.5) | 129 (54.7) | 20 (87.0) | |
| Post abortion | 30 (11.6) | 29 (12.3) | 1 (4.4) | |
| On other method of contraception | 36 (13.9) | 35 (14.8) | 1 (4.4) | |
| Prior contraception | | | | |
| No contraception | 119 (46.0) | 108 (45.8) | 11 (47.8) | 0.812 |
| LARC | 28 (10.8) | 26 (11.0) | 2 (8.7) | |
| Non-LARC | 112 (43.2) | 102 (43.2) | 10 (43.5) | |
| Number of children | | | | |
| 0-1 | 203 (78.4) | 185 (78.4) | 18 (78.3) | 0.586 |
| > 1 | 56 (21.6) | 51 (21.6) | 5 (21.7) | |
| Occupation (missing data = 46) | | | | |
| Student | 52 (24.4) | 51 (26.3) | 1 (5.3) | 0.094 |
| Agriculturist | 4 (1.9) | 3 (1.6) | 1 (5.3) | |
| Government officer | 44 (20.7) | 42 (21.7) | 2 (10.5) | |
| Office worker | 87 (40.9) | 72 (37.1) | 15 (79.0) | |
| Homemaker | 26 (12.2) | 26 (13.4) | 0 (0.0) | |
| Underlying disease[b] | | | | |
| No | 239 (92.3) | 220 (93.2) | 19 (82.6) | 0.401 |
| Yes | 20 (7.7) | 16 (6.8) | 4 (17.4) | |
| Type of contraceptive implant | | | | |
| ENG implants | 103 (39.8) | 94 (39.8) | 9 (39.1) | 0.948 |
| LNG implants | 156 (60.2) | 142 (60.2) | 14 (60.9) | |

BMI: body mass index; LARC: long-acting reversible contraception, ENG: etonogestrel , LNG: levonorgestrel

Data are presented as n (%)

[a] Based on Pearson $\chi^2$ tests or Fisher's exact test as appropriate.

[b] Underlying disease included migraine, arrhythmia and valvular heart disease.

**Table 2.** Unadjusted associations of side effects with implant continuation.

| Side effects | Total (n=259) | Continuation group (n=236) | Discontinuation group (n=23) | p value[a] |
|---|---|---|---|---|
| Heavy bleeding | 5 (1.9) | 5 (2.1) | 0 (0.0) | 0.941 |
| Spotting | 125 (48.3) | 112 (47.5) | 13 (56.5) | 0.414 |
| Irregular menstruation | 38 (14.7) | 33 (14.0) | 5 (21.7) | 0.256 |
| Amenorrhea | 106 (40.9) | 96 (40.7) | 10 (43.5) | 0.774 |
| Dysmenorrhea | 14 (5.4) | 11 (4.7) | 3 (13.0) | 0.064 |
| Pelvic pain | 36 (13.9) | 31 (13.1) | 5 (21.7) | 0.204 |
| Leukorrhea | 15 (5.8) | 12 (5.1) | 3 (13.0) | 0.083 |
| Headache | 52 (20.1) | 44 (18.6) | 8 (34.8) | 0.059 |
| Fatigue | 24 (9.3) | 17 (7.2) | 7 (30.4) | 0.001 |
| Weight gain | 64 (24.7) | 56 (23.7) | 8 (34.8) | 0.216 |
| Breast tenderness | 13 (5.0) | 9 (3.8) | 4 (17.4) | 0.006 |
| Acne | 52 (20.1) | 45 (19.1) | 7 (30.4) | 0.168 |
| Decreased libido | 46 (17.8) | 38 (16.1) | 8 (34.8) | 0.024 |
| Cholasma | 21 (8.1) | 19 (8.1) | 2 (8.7) | 0.714 |
| Pain/infection at insertion site | 14 (5.4) | 14 (5.9) | 23 (100.0) | 0.442 |
| Other side effects[b] | 4 (1.5) | 2 (0.8) | 2 (8.7) | 0.010 |

Data are presented as n (%)

[a] Based on Pearson $\chi^2$ tests or Fisher's exact test as appropriate.

[b] Other side effects included emotional lability, decreased appetite, and palpitation.

**Table 3.** Descriptive summary of implant discontinuation[a]

| Summary characteristic | n (%) |
|---|---|
| Reason for removal | |
| Wanted to become pregnant | 3 (13) |
| Bleeding problems | 4 (17.4) |
| Amenorrhea | 2 (8.7) |
| Acne | 2 (8.7) |
| Weight gain | 2 (8.7) |
| Insertion site complication | 2 (8.7) |
| Divorce | 2 (8.7) |
| Hysterectomy | 2 (8.7) |
| Weight loss | 2 (8.7) |
| Fatigue | 2 (8.7) |
| Contraceptive choice after removal | |
| Combined hormonal contraception | 5 (21.7) |
| Condom | 1 (4.3) |
| DMPA | 1 (4.3) |
| IUDs | 1 (4.3) |
| None | 15 (65.2) |

[a] Discontinued prior to 12 months (n = 23).

Table 4. displays the crude and adjusted OR from our analyses. After adjusting for age, baseline status, number of children, underlying disease, and side effects (fatigue, spotting, and other side effects), we found that those women who were in their postpartum period (adjusted OR 8.11, 95%CI 1.23 - 53.44), had underlying disease (adjusted OR 5.46, 95%CI 1.27 - 23.43) or fatigue (adjusted OR 5.35, 95%CI 1.83 - 15.53), or experienced other side effects (adjusted OR 13.64, 95%CI 1.80 - 103.33) were more likely to remove the contraceptive implant by 12 months.

**Table 4.** Logistic regression modeling predicting contraceptive implant discontinuation.

| | Crude OR | p value | Adjusted OR[a] (95% CI) | p value |
|---|---|---|---|---|
| Age | | | | |
| < 20 | 1 | | 1 | |
| 20-35 | 2.08 (0.74 to 5.88) | 0.165 | 1.83 (0.61 to 5.52) | 0.280 |
| > 35 | 0.42 (0.05 to 3.75) | 0.439 | 0.49 (0.07 to 3.61) | 0.480 |
| Status at baseline | | | | |
| No contraception | 1 | | 1 | |
| Postpartum period | 6.67 (0.87 to 51.16) | 0.068 | 8.11 (1.23 to 53.44) | 0.030 |
| Post abortion | 1.48 (0.87 to 24.67) | 0.784 | 1.49 (0.12 to 18.79) | 0.758 |
| On other method of contraception | 1.23 (0.07 to 20.36) | 0.886 | 3.05 (0.24 to 38.37) | 0.387 |
| Number of children | | | | |
| 0-1 | 1 | | 1 | |
| > 1 | 1.01 (0.36 to 2.85) | 0.989 | 0.89 (0.29 to 2.76) | 0.838 |
| Underlying disease | | | | |
| No | 1 | | | |
| Yes | 2.89 (0.88 to 9.53) | 0.080 | 5.46 (1.27 to 23.43) | 0.022 |
| Fatigue | | | | |
| No | 1 | | 1 | |
| Yes | 5.70 (2.11 to 15.36) | 0.001 | 5.35 (1.83 to 15.53) | 0.002 |
| Spotting | | | | |
| No | 1 | | 1 | |
| Yes | 1.42 (0.61 to 3.32) | 0.414 | 1.22 (0.47 to 3.13) | 0.686 |
| Other side effects | | | | |
| No | 1 | | 1 | |
| Yes | 10.91 (1.79 to 66.50) | 0.010 | 13.64 (1.80 to 103.33) | 0.011 |

OR: odds ratio

[a] Stepwise logistic regression procedure employed. P < 0.1 required to qualify for modeling. Variables eligible but not retained: occupation, breast tenderness, and libido.

# Discussion

In the present study, the rate of discontinuation of contraceptive implant use within 12 months was low. Insertion of the implant after delivery, underlying

disease, and side effects were the risk factors for early discontinuation. The presence of side effects was the main reason for removal.

The early discontinuation rate of 8.9% found in this study was slightly lower than those revealed in previously published studies. Analyses from the CHOICE cohort in the United States (US) showed that 81.9% were still using this method of contraception at 12 months[16]. A study of 711 women in Ethiopia found that 23.4% of participants discontinued use of their devices by 12 months[17]. A retrospective chart audit of 976 implant users in Australia found a 26% discontinuation rate at 12 months[9]. However, all subjects in those studies were women who used ENG implants, and there is little evidence available regarding 12-month discontinuation in women with LNG implants. Bahamondes et al reported a discontinuation rate among Brazilian women with LNG implants of 28.2% at 2.5 years of use[18]. The early discontinuation rate in Thailand has not changed over the past decade[6]. The mean duration of use in this study was within the range of those in previously published studies (7.5-9.6 months)[15, 17].

Although bleeding problems were common in women using progestogen-only contraception, this did not appear to be the main contributor to the premature removal of contraceptive implants in this study. Around half of the women had menstrual side effects, but few had their devices removed early for this reason. This finding was not consistent with the results from previous studies, in which bleeding was the predominant reason for removal[14,16]. This discrepancy could be due to the fact that all participants were provided with standardized, comprehensive counseling according to our institution's policy. Recently published data from a study in Ethiopian women demonstrated that women who were not counseled were more likely to have their devices removed prematurely (adjusted OR 2.45, 95%CI 1.05 - 5.69)[7]. Only 13% of the women in this study who discontinued use of the device did so to regain fertility. However, 65.2% of women who had their devices removed chose not to use any other form of contraception, making them vulnerable to unwanted pregnancy. This rate corresponded to that found by a previous study in adolescent women[15].

The postpartum period represents a window of opportunity to initiate contraception. However, multivariate analysis in this study revealed that women in the postpartum period were more likely to discontinue use of contraceptive implants compared to those who did not use any contraception at baseline. This finding differed from those of a previous study conducted in the United States[19]. Postpartum women may have fatigue and weight loss which are mistaken for side effects of contraception. Further study (including qualitative research) on postpartum initiation of contraceptive implants should be conducted in order to elucidate the reasons behind this.

This study revealed that underlying disease was a predictor of early removal of contraceptive implants All women with underlying diseases in this cohort who requested their devices be removed had valvular heart disease. This might be due to concern regarding the safety of these methods. A cross-sectional study of 100 women with congenital heart disease found that these patients lacked knowledge regarding the safety of LARC methods. Moreover, 10% of the women perceived LARC as being unsafe[20].

Women who developed side effects (especially fatigue) were more likely to discontinue use early. Although previous research has found that side effects substantially affected the continuation of implant use[7, 8], the results of those studies differed from those of the present study in that fatigue was not identified as predictor of early discontinuation. Beliefs and environmental factors may play an important role in these differences[21].

A strength of this study was that the initiation of contraceptive methods occurred in a setting in which personnel and resources were unconstrained, thus ensuring that all participants received the necessary information. We examined the early discontinuation data regarding different types of contraceptive implants. However, our study also had some limitations. Due to the small number of events that occurred during study period, we were unable to precisely determine the effect of factors associated with early discontinuation. Furthermore, the retrospective nature of this study

means that data regarding some factors that may have affected continuation, such as treatment of bleeding problems, which were not collected.

## Conclusion

Concerns regarding the early discontinuation of contraceptive implants may make physicians reluctant to provide this type of contraception. We found a low discontinuation rate at 12 months regardless of the type of implant used. Understanding of side effects played an important role in sustaining use, which emphasizes the need for pre-insertion counseling. However, some women still stop using the contraceptive implant despite not desiring to become pregnant. Physicians should emphasize the importance of switching contraceptive methods to those patients who still require contraception.


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## Potential conflicts of interest

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