Discontinuation of Different Contraceptive Methods in Thai Women During a One-year Period: A Cohort Study

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Research

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Abstract

Background

Even though almost 80% of sexually active Thai women use modern contraceptives, yet unintended pregnancy remains a significant reproductive health issue. One possible explanation is that the women do not use contraceptives or stopped using contraceptives at some point in their lifetime. At present, there is scant information available about contraceptive discontinuation among Thai women. We assessed the discontinuation rate and the reason for discontinuation of the four most common contraceptives used by reproductive aged Thai women: combined oral contraceptive pills (COCs), depot medroxyprogesterone acetate (DMPA), copper IUD, and contraceptive implant(s).

Methods

There were 1,880 women aged 18-45 years recruited from the Family Planning Clinic of the Chulalongkorn Hospital in Bangkok. The participants were followed at months 3, 6 and 12 either by attending the clinic or being interviewed via a phone call. Incidence density and cumulative incidence based on the Kaplan-Meier approach were used to assess contraceptive discontinuation. Cox proportional hazards model was used to determine significant personal risks of discontinuing contraceptive.

Results

Among all, 839 (44.6%) women initiated COCs; 494 (26.3%) initiated DMPA; 280 (14.9%) initiated copper IUD and 267 (14.2%) initiated contraceptive implant(s). The incidence density for discontinuation of COCs, DMPA, copper IUD, and contraceptive implant(s) were 21.33, 9.21, 4.36, and 2.26 / 100 person-year, respectively. Most of the women (185/222) discontinued their contraceptives because of the side effects. Compared to the contraceptive implant(s) users, adjusted HR (95% CI) of discontinuing COCs, DMPA, and copper IUD were 9.92 (4.38-22.46), 4.25 (1.81-9.98), 2.16 (0.81-5.76), respectively. Lower-income, higher parity numbers, history of miscarriage, and history of abortion were independent predictors of contraceptive discontinuation in a multivariable model.

Conclusions

The discontinuation rate of COCs, the most popular contraceptive method for Thai women, was the highest during the one-year period of the study. The primary reason for discontinuing the use of the various contraceptive methods was the side effects.

Plain English Summary

Almost 80% of sexually active Thai women use modern birth control methods. However, unintended pregnancy and unsafe abortion remain a significant public health issue in this country. One possible explanation is that the women do not use contraception or stopped using contraception at some point in

their lifetime. There is scant information available on contraceptive discontinuation among Thai women. We followed 1,880 women aged 18-45 years attending the family planning clinic at a tertiary hospital in Bangkok, Thailand. The study period occurred before birth control became freely available through the national health care program. The participants came for clinic visits or were interviewed by using the phone at 3, 6, and 12 months after initiating four different methods of birth control: oral contraceptive pills, depo shot, copper intrauterine device (IUD), and contraceptive implant(s). None of the participants were lost to follow-up. The discontinuation rate for the four mentioned birth control methods were approximately 20%, 10%, 4%, and 2%, respectively. Most women stopped using contraceptives because of its side effects. There were nine unintended pregnancies of which all occurred among women who stopped oral contraceptive pills. All of these unplanned pregnancies ended in induced abortions. We conducted a statistical test to account for the differences of the women's personal characteristics. The results showed that women initiating oral contraceptive pills or depo shot were more likely to discontinue their birth control than women starting long-acting reversible contraception (LARC), including copper IUD and contraceptive implant(s). Additionally, women with lower income, having many children, and having a history of abortion were more likely to stop using birth control even after accounting for different personal characteristics. Since very few participants discontinued using LARC, we suggest that LARC should be offered to women with a higher risk of contraceptive discontinuation.

Background

Despite the fact that Thailand has been praised as a country which has been highly successful in the implementation of family planning [1], yet currently there is an unmet need for contraception [2]. Since the adoption of the national population policy in 1971, Thailand's contraceptive use has leapt from 14.8 percent in 1970 to an impressive 78.4 percent in 2016 [3], while the total fertility rate has dropped from 4.8 to 1.5 [4]. Nevertheless, the incidence of unintended pregnancy and unsafe abortion remain a major reproductive health issue. In a 1999 study, conducted by Thailand's Department of Health, Ministry of Public Health, the maternal death due to unsafe abortion was as high as 300 per 100,000 women, while the maternal mortality rate was 24 per 100,000 women [5]. According to a reproductive health survey in two small communities in Thailand, thirty three percent of pregnancies were unintended [6]. These pregnancies correlated with the number of reproductive health consequences and adverse pregnancy outcomes [7]. Non-use or discontinuing the use of contraception poses a significant risk factor for these preventable incidents [8]. Even though the rate of Thailand's contraceptive prevalence is almost 80% [3], however, the unintended pregnancy is still an issue in Thailand. In other words, these reproductive aged Thai women might omit or inconsistently use their contraceptives during a particular period.

Although many studies have been conducted on the discontinuation of contraceptives, but most of the studies have only focused on a particular group of women or certain contraceptive method [9]. Thai women are unique in terms of both ethnicity and which type of contraceptive methods they commonly used [2]. Existing evidence demonstrated that the discontinuation of contraception varied according to the type of contraceptive used, age, race, ethnic background, and time when the contraception was initially used [10-12]. For instance, intrauterine devices (IUD) and contraceptive implant(s), which were

considered as long-acting reversible contraception (LARC), had the lowest discontinuation rate compared to all temporary contraceptives [13]. Younger aged women tended to discontinue their methods earlier than other age groups [13]. Ethnicity has a substantial effect on the rate of contraceptive discontinuation [12]. Evidently, there is a considerable difference in the discontinuation rate of contraception.

Since there is a substantial difference in the contraceptive discontinuation among diverse groups, in order to refine family planning policy in Thailand, public health policy planners need a more specific information from reproductive aged Thai women. At present, there is scant information available regarding the discontinuation of the contraceptives most commonly used by Thai women. Therefore, this study was conducted to investigate the discontinuation rate and the reason for discontinuation of the four most common contraceptives used by reproductive aged Thai women: combined oral contraceptive pills (COCs), depot medroxyprogesterone acetate (DMPA), copper IUD, and contraceptive implant(s). In addition, this study assessed the significant personal risks of discontinuing the various contraceptive methods used. The incidence of unintended pregnancy during the one-year period of the study was also examined. Such indispensable evidence will enable healthcare providers to provide better tailored family planning services to women who are at high risk of discontinuing their use of contraception in order to prevent unintended pregnancy and unsafe abortions death.

Methods

2.1 Study population and procedures

This cohort study enrolled potentially eligible 1,912 women who attended the Family Planning and Reproductive Health Clinic, Chulalongkorn Memorial Hospital, Bangkok, Thailand, from January 2009 – December 2012. This period occurred before LARCs became freely available through the national health care program for all adolescents. For this study, the eligible criteria were: sexually active Thai women aged 18-45 years, were not pregnant and did not have any plans to become pregnant for at least one year after joining the study, desired to initiate one of the four types of contraceptives used in the study (COCs, DMPA, copper IUD, or contraceptive implant(s), did not have any contraindication for the selected method, and could provide consent in Thai. This study was approved by the ethical committee of the Faculty of Medicine, Chulalongkorn University (IRB#162/62).

2.2 Measurements

All women underwent standardized contraceptive assessment from the family planning nurses. The following information were acquired from the women: medical history, last menstrual period, history of unprotected sexual intercourse, and history of contraindications to estrogen-progesterone contraceptives. General physical examination including blood pressure and body weight measurement were done. Additionally, if indicated, the women underwent pelvic examination and cervical cytological screening. Subsequently, women were educated with up-to-date evidence-based and precise information of each contraceptive method, its effectiveness, risk of side effects and tips on adherence. Then, the women selected their method of contraceptive which was provided by the Family Planning facility.

At enrollment, all women completed the self-administered questionnaires regarding their demographic data. The authors assessed the women's future pregnancy plan by asking this question, "Do you plan on having children someday?"; the provided answers were "Yes, I will", "No, I won't", and "I am not sure." Since sexual intercourse could indirectly affect the adherence to the contraception, therefore the authors also asked the following question, "How frequently do you have sex?". The choices were either "once a week" or "more than once a week". All women were followed up to twelve months via either interviewing the women directly at the facility or telephone call. The women were followed at months 3, 6 and 12 to assess their status of using the contraceptives and the incidence of unintended pregnancies. The authors defined discontinuation of the contraception as abandoning the use of COCs for at least one month, intend to miss her DMPA shot or miss her DMPA shot for at least two weeks, removal of copper IUD or contraceptive implant(s).

2.3 Statistical Analysis

Women's basic characteristics were reported as mean, standard deviation, proportion, and percentage. To examine discontinuation rate among each contraceptive, incidence density and cumulative incidence based on the Kaplan-Meier (exact-events times) approach were used. Cox proportional hazards model was used to determine significant personal risks of discontinuing contraceptive. To test the proportional hazards assumption, we plotted the log-log transformation of the survival function for contraceptive type adjusted for other terms in final multivariable model, against the log study time.

Results

Among 1,912 women who were potentially eligible for this study, we excluded 32 women because they were younger than 18 years old or older than 45 years old. A total of 1,880 women were included in this study; 839 (44.6%) women initiated COCs, 494 (26.3%) initiated DMPA, 280 (14.9%) women initiated copper IUD and 267 (14.2%) women initiated contraceptive implant(s). Demographic data with respect to each contraceptive method are shown in Table 1. The answers to the following two questions, "Do you plan on having children some day?" and "How frequently do you have sex?" are also provided in Table 1. Most women were sexually active and had sex more than once a week. Almost all women (99.9%) were cohabited or married.

The cumulative probability of discontinuation for each contraceptive and all methods at months 3, 6, and 12 are shown in Figure 1. Apparently, copper IUD and contraceptive implant(s), considered as LARCs, had low cumulative discontinuation rate during the one-year period. None of the participants were lost to follow-up. All women were followed until they discontinued using the contraceptive or completed the study. Incidence density for discontinuation of COCs was 21.33/ 100 person-year which had the highest rate of discontinuation among all four methods. Incidence density for discontinuation of DMPA was 9.21/ 100 person-year. Among the LARCs group, the incidence density for discontinuation of copper IUD was 4.36/ 100 person-year. Incidence density for discontinuation of contraceptive implant(s) was 2.26/ 100 person-year, which was the lowest among all four methods. The survival probabilities of each

contraceptive during the one-year period are shown in Figure 2. Most women (185/222) discontinued their contraceptives because of the side effects; few women (7/222) discontinued their contraceptives because they wanted to become pregnant; few women (29/222) discontinued their contraceptives because it was cumbersome to take the pills every day; one woman (1/222) stated that since she ended her relationship, thus she discontinued her contraception. The most common side effects of COCs were nausea/vomiting (51/126) and headache (42/126). For DMPA, bleeding and spotting (35/41) were the major causes for discontinuation. For copper IUD, pelvic pain and dysmenorrhea (10/12) were the main causes for discontinuation. For contraceptive implant(s), all women (6/6) stated that they discontinued their contraceptive implant(s) due to spotting. Among all women who discontinued their contraceptives, nine women had unintended pregnancy which ended in induced abortion. All of these women discontinued COCs.

The unadjusted hazard ratio (HR) and adjusted hazard ratio (aHR) with 95% confidence interval (CI) are shown in Table 2. The results showed that type of contraceptives, income level, number of parity, history of miscarriage and history of abortion were significant predictors for contraceptive discontinuation in the final cox-proportional hazard model. In addition, COCs use, history of abortion, and DMPA use were the top three significant predictors of 1-year contraceptive discontinuation; the aHR of using COCs was as high as 9.92 (4.38 – 22.46); history of abortion had an aHR equal to 5.31 (3.12 – 9.51); DMPA use had an aHR of 4.25 (1.81 – 9.98). The proportional hazards assumption was met as the log-log plots showed curves that were approximately parallel.

Discussion

Among all four type of contraceptives, COCs were the most popular one used by Thai women and had the highest discontinuation rate during the one-year period of its use. Women who initiated DMPA had lower discontinuation rate than COCs, but higher discontinuation rate than copper IUD and contraceptive implant(s). Adjusted hazard ratio of COCs and DMPA were significant in multivariable Cox proportional hazard model. These results were consistent with previous clinical studies [13, 14] which showed significant lower contraceptive discontinuation among women who used LARC compared to the other methods. However, the rates of contraceptive discontinuation during the one-year period for all four types of contraceptives in this study were quite low. One of the possible explanations for this is that some women might be former users of the selected method since we included the contraceptive initiation during postpartum visits. Additionally, this study was conducted at a specialized family planning facility located in a tertiary care setting which provided extended counseling and comprehensive family planning services. Therefore, it should be noted that the results of this study cannot be generalized to other clinical settings that do not provide such services.

The side effects of each contraceptive method played a major role in contraceptive discontinuation. These adverse effects are predictable and specific to each contraceptive. For instance, nausea/vomiting, headache, and breast tenderness, which were associated with estrogen, were commonly experienced by COCs users. Similarly, progestogen was associated with bleeding and spotting among DMPA and

contraceptive implant(s) users. These bothersome side effects usually occurred during the first few months of contraceptive use and can be mitigated by appropriate medical management as well as counseling. Hence, in order to encourage the continuation of the contraceptive, the family planning providers should tailor the counseling according to the type of contraceptive the woman has selected and inform her about the side effects. Besides this, the cumbersome side effects of the contraceptive should be managed properly.

Lower income level, higher numbers of parity, and history of abortion and miscarriage were considered as significant predictors for one-year contraceptive discontinuation in this study. Lower income and higher numbers of parity were also significant predictors of contraceptive discontinuation in another clinical study [15]. Lower income level might be associated with low education so it is possible that the women may not know how important it is to use the contraceptive to prevent unintended pregnancy [14]. Unfortunately, this study did not include information regarding education level. For history of abortion, this independent variable showed the second highest hazard ratio (HR = 5.19, 95% CI = 3.04 – 8.87). Since abortion stemmed from unintended pregnancy, this might infer that the history of unintended pregnancy was also a significant predictor for contraceptive discontinuation.

Even though this study had a longitudinal design which is an ideal design for studying the causal relationship, yet there were some limitations. Some independent variables such as the intention to have children and frequency of sexual activity were assessed only once at the onset of the study despite that these factors tended to change overtime. As a result of this, the association between future plan of having children and frequency of sexual activities with contraceptive discontinuation in this study might not truly represent the causal relationship.

Aside from the limitation, the strength of this study was the large sample size and none of the women were lost to follow-up. To the best of our knowledge, this study is the first study that was conducted among healthy reproductive aged Thai women to assess the contraceptive discontinuation of four different commonly use contraceptives. This information is indispensable for family planning facilities and provides strategies to ensure that the contraceptives are used continuously until there is a desire to start a family. Women with lower income, higher numbers of parity, history of miscarriage and history of abortion should be provided with tailored comprehensive family planning counseling and services in order to mitigate the issue of early contraceptive discontinuation. In other words, family planning providers should pay particular attention to these women. LARCs including IUD and contraceptive implant(s) might be ideal contraceptive choice for these women.

Conclusion

Among Thai women, LARCs users were significantly associated with lower rate of one – year contraceptive discontinuation. Women with lower income, higher numbers of parity, history of miscarriage and abortion had significantly higher risks for contraceptive discontinuation. Family planning

providers should pay more attention to these women and look for the appropriate strategy to mitigate the issue of contraceptive discontinuation.

Abbreviations

Adjusted hazard ratio (aHR)

Combined oral contraceptive pills (COCs)

Confidence interval (CI)

Depot medroxyprogesterone acetate (DMPA),

Hazard ratio (HR)

Intrauterine devices (IUD)

Long-acting reversible contraception (LARC)

Declarations

Ethics approval and consent to participate

This study was approved by the ethical committee of the Faculty of Medicine, Chulalongkorn University (IRB#162/62).

Consent for publication

Not applicable

Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

None of the authors have any conflicts of interest or financial ties to disclose.

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Authors' contributions

JU performed study concept design and manuscript revision for intellectual content.

SM performed data acquisition and literature review.

SS performed data analysis, primary manuscript drafting, editing and revision for intellectual content/ literature review.

All authors read and approved the final manuscript.

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References

- [1] Rosenfield A, Bennett A, Varakamin S, Lauro D. Thailand's family planning program: An Asian success story. *Int Fam Plan Perspect*. 1982;8:43-51. <https://www.semanticscholar.org/paper/Thailand's-family-planning-program%3A-an-Asian-story.-Rosenfield-Bennett/68fc5a3d97fd2979270674f6b86520d538f222f3>
- [2] National Statistical Office Thailand. Key Findings: The 2009 Reproductive Health Survey. 2010. http://web.nso.go.th/en/survey/reprod/data/rhs09_100810.pdf. Accessed 1 Sep 2020.
- [3] The world bank. Contraceptive prevalence, any methods (% of women ages 15-49) – <https://data.worldbank.org/indicator/SP.DYN.CONU.ZS?locations=TH>. Accessed 18 Oct 2020].
- [4] The world bank. Fertility rate, total (births per woman) – <https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=TH>. Accessed 18 Oct 2020.
- [5] Boonthai N, Warakarmin S. Induced Abortion: Nationwide Survey in Thailand. *Thailand Journal of Health Promotion and Environmental*. 2002;7. http://www.regional.org.au/au/mwia/papers/full/14_nongluk.htm
- [6] Women's health advocacy foundation thailand. Unintended pregnancy in thailand 2006. <https://www.hiso.or.th/hiso/picture/reportHealth/ThaiHealth2006/THAI2006-Health-Indicators2.pdf>. Accessed 18 Oct 2020.
- [7] Hall JA, Benton L, Copas A, Stephenson J. Pregnancy Intention and Pregnancy Outcome: Systematic Review and Meta-Analysis. *Matern Child Health J*. 2017;21:670-704; doi:10.1007/s10995-016-2237-0.
- [8] Sonfield A, Hasstedt K, Benson GR. In: Moving forward: family planning in the era of health reform. <https://www.guttmacher.org/report/moving-forward-family-planning-era-health-reform>. Accessed 1 Sep 2020.
- [9] Lazenby G, Francis E, Brzozowski N, Rucker L, Dempsey A. Postpartum LARC discontinuation and short interval pregnancies among women with HIV: a retrospective 9-year cohort study in South Carolina. *Contraception*. 2019;100:279-82; doi:10.1016/j.contraception.2019.06.007.
- [10] Cohen R, Sheeder J, Teal SB. Predictors of Discontinuation of Long-Acting Reversible Contraception Before 30 Months of Use by Adolescents and Young Women. *J Adolesc Health*. 2019;65:295-302; doi:10.1016/j.jadohealth.2019.02.020.
- [11] Jones AE, Kaul S, Harding J, Weldon DLM, Akers AY. Follow-Up Care and 6-Month Continuation Rates for Long-Acting Reversible Contraceptives in Adolescents and Young Adults: A Retrospective Chart Review. *J Pediatr Adolesc Gynecol*. 2020;33:39-44; doi:10.1016/j.jpag.2019.09.003.
- [12] Rozina T, Saleem J, Iqbal A, Sayyeda R, Neelofar S, Shafquat R, et al. Factors associated with the discontinuation of modern methods of contraception in the low income areas of Sukh Initiative Karachi:

A community-based case control study. PLoS One. 2019;14:e0218952.
[doi:10.1371/journal.pone.0218952](https://doi.org/10.1371/journal.pone.0218952).

[13] Diedrich JT, Zhao Q, Madden T, Secura GM, Peipert JF. Three-year continuation of reversible contraception. Am J Obstet Gynecol. 2015;213:662.e1-8; [doi:10.1016/j.ajog.2015.08.001](https://doi.org/10.1016/j.ajog.2015.08.001).

[14] Simmons RG, Sanders JN, Geist C, Gawron L, Myers K, Turok DK. Predictors of contraceptive switching and discontinuation within the first 6 months of use among Highly Effective Reversible Contraceptive Initiative Salt Lake study participants. Am J Obstet Gynecol. 2019;220:376 e1- e12; [doi:10.1016/j.ajog.2018.12.022](https://doi.org/10.1016/j.ajog.2018.12.022).

[15] Puri M, Henderson JT, Harper CC, Blum M, Joshi D, Rocca CH. Contraceptive discontinuation and pregnancy postabortion in Nepal: a longitudinal cohort study. Contraception. 2015;91:301-7; [doi:10.1016/j.contraception.2014.12.011](https://doi.org/10.1016/j.contraception.2014.12.011).

[16] WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet. 2004;363:157-63; [doi:10.1016/S0140-6736\(03\)15268-3](https://doi.org/10.1016/S0140-6736(03)15268-3).

Tables

Table 1

Baseline characteristics of the women and their use of the contraceptive method.

Independent Variable	COCs	DMPA	Copper-IUD	Implant(s)	Total
	839 (44.6)	494 (26.3)	280 (14.9)	267 (14.2)	1,880
Age, years, n, %					
18-19	21 (1.1)	25 (1.3)	4 (0.2)	19 (1.0)	69 (3.7)
20+	818 (43.5)	469 (25.0)	276 (14.7)	248 (13.2)	1811 (96.3)
Weight, kg, mean, SD	52.32 (6.6)	51.31 (3.4)	50.52 (2.8)	50.88 (3.1)	51.58 (5.1)
Height, cm, mean, SD	158.8 (3.9)	159.5 (3.1)	159.8 (3.3)	159.7 (3.0)	159.3 (3.5)
BMI ^a , n, %					
< 18.5	80 (4.3)	35 (1.9)	43 (2.3)	16 (0.9)	174 (9.3)
18.5 – 22.9	643 (34.2)	437 (23.2)	234 (12.5)	247 (13.1)	1561 (83.0)
23.0 – 24.9			3 (0.2)	4 (0.2)	78 (4.2)
>= 25.0	53 (2.8)	18 (1.0)	0	0	67 (3.6)
	63 (3.4)	4 (0.2)			
Career, n, %					
- Employee	503 (60.0)	259 (52.4)	198 (70.7)	143 (53.6)	1103 (58.7)
- Housewife	204 (24.3)	136 (27.5)	54 (19.3)	66 (24.7)	460 (24.5)
- Others	132 (7.0)	99 (5.3)	28 (1.5)	58 (3.1)	317 (16.9)
Income, baht ^b , n, %					
=< 9,000	279 (14.7)	151 (8.0)	72 (3.8)	76 (4.0)	575 (30.6)
> 9,000	563 (30.0)	343 (18.2)	208 (11.1)	191 (10.2)	1,305 (69.4)

Religion, n, %					
- Buddhist	831 (99.0)	486 (98.4)	277 (98.9)	265 (99.3)	1859 (98.9)
- Christ	2 (0.2)	1 (0.2)	0	0	3 (0.2)
- Muslim	6 (0.7)	7 (1.4)	3 (1.1)	2 (0.8)	18 (1.0)
Parity, n, %					
0	14 (0.7)	0	4 (0.2)	1 (0.1)	19 (1.0)
1	573 (30.5)	304 (16.2)	164 (8.7)	151 (8.0)	1192 (63.4)
2	234 (12.5)	177 (9.4)	109 (5.8)	98 (5.2)	618(32.9)
>= 3	18 (1.0)	13 (0.7)	3 (0.2)	17 (0.9)	51 (2.7)
History of miscarriage , n, %					
Yes					
No	166 (8.8)	72 (3.8)	27 (1.4)	36 (1.9)	301 (16.0)
	673 (80.2)	422 (85.4)	253 (90.4)	231 (86.5)	1579 (84.0)
History of abortion , n, %					
Yes	16 (1.9)	7 (1.4)	3 (1.1)	4 (1.5)	30 (1.6)
No	823 (98.1)	487 (98.6)	277 (98.9)	263 (98.5)	1850 (98.4)

Do you plan on having children some day?, n, %					
1. Yes					
2. No					
3. Not sure	319 (38.0)	147 (29.8)	63 (22.5)	76 (28.5)	605 (32.2)
	237 (28.3)	166 (33.6)	111 (39.6)	106 (39.7)	620 (33.0)
	283 (33.7)	181 (36.6)	106 (37.9)	85 (31.8)	655 (34.8)
How frequently do you have sex?, n, %					
1. once a week	177 (21.1)	119 (24.1)	73 (26.1)	54 (20.2)	423 (22.5)
1. more than once a week	662 (78.9)	375 (75.9)	207 (73.9)	213 (79.8)	1457 (77.5)

^aAccording to Asian BMI category, < 18.5 was defined as underweight, 18.5 – 22.9 was defined as normal weight, 23.0 – 24.9 was defined as overweight, and >= 25.0 was defined as obese [16].

^b1 US Dollar equals to 31.25 Thai baht (2012)

Table 2

The unadjusted and adjusted hazard ratio from cox-proportion hazard model.

	Unadjusted model		Adjusted model	
	HR	(95% CI)	aHR	(95% CI)
Type of contraceptive				
COCs	9.36	4.15 - 21.15	9.92	4.38 - 22.46
DMPA	4.06	1.73 - 9.54	4.25	1.81 - 9.98
Copper-IUD	1.93	0.72 - 5.13	2.16	0.81 - 5.76
Implant(s)	Reference		Reference	
Age (Years)				
18-19	1.39	0.76- 2.55		
20+	Reference			
BMI ^a (kg/m2)				
< 18.5	0.99	0.62 - 1.59		
18.5 – 22.9	Reference			
23.0 – 24.9	2.22	1.37 - 3.63		
>= 25.0	2.02	1.17 - 3.48		
Income ^b (Baht)				
=< 9,000	1.57	1.20 – 2.05	1.53	1.17 - 2.01
> 9,000	Reference		Reference	
Career				
- Employee	Reference			
- Housewife	1.25	0.93 - 1.69		
- Others	0.81	0.54 - 1.20		

Parity				
0	1.58	0.50 - 4.97	0.76	0.24 - 2.45
1	Reference		Reference	
2	1.24	0.94 - 1.64	1.50	1.13 - 1.98
>= 3	2.27	1.26 - 4.10	2.82	1.54 – 5.14
History of miscarriage				
Yes	1.67	1.29 - 2.15	1.61	1.18 - 2.20
No	Reference		Reference	
History of abortion				
Yes	5.63	3.33 - 9.51	5.31	3.12 – 9.05
No	Reference		Reference	
Do you think you will have children in the future?				
A. Yes	0.77	0.56 - 1.05		
B. No	Reference			
C. Not sure	0.65	0.47 - 0.90		

^aAccording to Asian BMI category, < 18.5 was defined as underweight, 18.5 – 22.9 was defined as normal weight, 23.0 – 24.9 was defined as overweight, and >= 25.0 was defined as obese [16].

^b1 US Dollar equals to 31.25 Thai baht (2012)

Figures

Figure 1

Cumulative proportion of contraceptive discontinuation at months 3, 6 and 12.

Figure 2

Survival probability of each contraceptive. From top to bottom, the top line represents implant(s), the line below that represents copper IUD, the third line represents DMPA and the bottom line represents COCs.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [DiscontinuationSTROBEcohortchecklistBMC.docx](#)