

The effect of hormonal contraception and intrauterine device on the pattern of menstrual cycle

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Background

Many women discontinue their contraceptives owing to dissatisfaction with the method. Unscheduled bleeding is one of the main reasons cited by women for stopping a birth control method. Improving counseling and management of these adverse effects will aid in increasing satisfaction with contraceptive methods.

Objective

The aim of the work is to study the effects of hormonal contraceptives and intrauterine device on the pattern of menstrual cycle.

Patients and methods

This study was a descriptive study in family planning clinic at Women's Health Hospital, Faculty of Medicine, Assiut University, and Childhood and Maternity Care Center in the city of Dirout, Assiut, Egypt, on women using hormonal contraceptives or intrauterine devices. This study was done by using interviewing questionnaire.

Results

It was observed that the progestogen-only hormonal contraceptives like progestin-only pills (POPs), Depo-Provera, and Implanon produced disturbances in bleeding pattern in the majority of their users. With POPs, it was found that 22.4% of users were amenorrheic and 77.6% were menstruating. The menstrual cycle was regular in 57.9% and irregular in 42.1%. Menstrual disorders were found in 42.1% in the form of polymenorrhea in 62.5% and metrorrhagia in 32.5%. With Depo-Provera, it was found that 76.5% of users were amenorrheic and 23.5% were menstruating. The menstrual cycle was regular in 36.4% and irregular in 58.3%. Menstrual disorders were found in 58.3% in the form of oligomenorrhea in 21.4%, polymenorrhea in 42.9%, and metrorrhagia in 35.7%. With Implanon, it was found that 50.8% of users were amenorrhoeic and 49.2% were menstruating. The menstrual cycle was regular in 53.3% and irregular in 46.7%. Menstrual disorders were found in 46.7% in the form of oligomenorrhea in 50%, polymenorrhea in 14.9%, and metrorrhagia in 35.7%. Combined oral pills produced much better cycle control as compared with any of the other hormonal contraceptives. There were regular cycles in 83.7% of study users and irregular cycles in 16.3%. Menstrual disorders were found in 48.8% of study users. In this group, hypomenorrhea was seen in 66.7% and metrorrhagia was seen in 33.3%. The use of copper intrauterine device (IUD) was associated with regular menstrual cycles in 87.5% of study users and irregular in 12.5%. Menstrual disorders were found in 42.2% of study users. In this group, dysmenorrhea was found in 68.5%, metrorrhagia in 29.6%, and menorrhagia in 48.1% of these women.

Conclusion

This study concluded that hormonal contraceptive methods and IUD can affect the pattern of menstrual cycle and are considered risk factors for irregularity in vaginal bleeding patterns and discontinuation of the method.

Keywords:

copper intrauterine device, hormonal contraceptives, the pattern of menstrual cycle

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Introduction

Contraceptives are used by most married women in almost all regions of the world. In 2015, 64% of married women of reproductive age worldwide were using some form of contraception [1].

High rates of contraceptive discontinuation for reasons other than the desire for pregnancy are a public health concern because of their association with negative reproductive health outcomes [2]. There is evidence

that more than 84% of women during their life use one of the hormonal methods to prevent pregnancy [3]. Oral contraceptive pills (OCPs) are one of the most common methods of contraception, and more than 100 million women are using OCPs worldwide [4].

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Unscheduled bleeding is common during the first 3–6 months (30–50% of women initiating) of combined OCPs use and decreases over time (10–30% of women by the third month of use) [5].

Intermenstrual spotting is slightly more frequent in women initiating continuous regimens (although the majority, 90% of these women will develop amenorrhea within the first 12 months) [6].

Any type of bleeding irregularity can be expected with progestogen-only pills, including amenorrhea, irregular spotting or prolonged bleeding. Up to half of progestogen-only pills users will have a monthly menses, but progestogen-only pills users will have more unpredictable bleeding irregularities in both duration and frequency in comparison with combined OCPs users. Approximately 40% of users will have irregular bleeding and 10% will have amenorrhea [7].

Contraceptive injectables, both combined hormonal and progestogen only, offer safe and effective reversible contraception. More than 40 million women worldwide use contraceptive injectables, and in many low-resource countries, injectables account for at least one half of modern use [8].

Amenorrhea is common with Depo-Provera (DMPA), with 10–30% of users becoming amenorrheic within the first 3 months, 50% by the first year, and 80% by 5 years. Unscheduled spotting or light bleeding is also common with DMPA use, and during the first 3 months, episodes can last 7 days or longer. The frequency and duration of the episodes decreases over time [9].

With copper intrauterine device (IUD), unscheduled bleeding including spotting or light bleeding as well as heavier, prolonged menses can be expected in ~70% of new users within the first 3–6 months of use. Bleeding and pain are common causes of discontinuation [10].

Bleeding patterns are likely to change during use of a progestogen-only implant, where 20% of users will have no bleeding, and almost 50% will have infrequent, frequent, or prolonged bleeding. Bleeding patterns are likely to remain irregular over time [11].

Up to 43% of women will discontinue Implanon before completion of the 3 years, most of whom do so because of irregular bleeding patterns [12].

Patients and methods

Study design

This descriptive study was conducted to evaluate the effects of hormonal contraceptives and intrauterine device on the pattern of menstrual cycle.

Study subjects

Women using hormonal contraceptives or intrauterine devices Implanon (N.V. Organon, Oss, The Netherlands, a subsidiary of Merck & Co., Inc., Whitehouse Station, NJ 08889, USA) were included.

Study setting

This study was done in Family planning clinic at Women's Health Hospital Faculty of Medicine Assiut University and Childhood and Maternity care center in the city of Dirout, Assiut, Egypt.

Inclusion criteria

The following were the inclusion criteria:

- (1) Age from 18 to 45 years old.
- (2) Women using intrauterine device or hormonal contraceptive method for contraception.
- (3) Regular menses before using the contraceptive method.

Exclusion criteria

The following were the exclusion criteria:

- (1) Women with dysfunctional uterine bleeding.
- (2) Women with organic causes of uterine bleeding (e.g. endometritis, endometriosis, fibroid, cancer uterus, cancer cervix, cervical polyp, and vaginal carcinoma)
- (3) Women with chronic diseases that affect menstrual cycle (e.g. diabetes, hypertension, heart disease, and blood diseases).

Sample size calculation

Using two-sided χ^2 -test with α of 0.05, a total sample size of at least 383 patients will have 80% power to detect the vaginal bleeding associated with hormonal contraceptives and intrauterine device.

Tools for data collection

Interviewing questionnaire.

The following tool was developed by the researcher to collect data. The structured interviewing questionnaire included the following data.

Personal history

This includes age, level of education, occupation, and interval address.

Menstrual history

This includes duration of menstrual blood flow, amount of menstruation, menstrual regularity, disorders, and presence of amenorrhea.

Obstetrical history

This includes parity number of abortion.

Family planning history

This includes last contraceptive method, duration of using, the pattern of menstrual cycle with this method, type of methods used before, duration of using, the pattern of menstrual cycle with this method, and causes of discontinuation.

Ethical consideration*Field work*

During the meeting with the women, the researcher greeted the women, and after that, an oral informed consent was obtained from them to participate in the study. Then the researcher provided full explanation to the women about the nature, aim of the study, and their rights for privacy and confidentiality to build a trust relationship. The researcher asked women the questions presented in the sheet, and then she filled in the sheet. Each interview took ~10–15 min to complete the sheet and fill all questions, and at the end of meeting, the researcher greeted the women again.

Statistical analysis

Data were tabulated using the statistical package for the social sciences (SPSS) (IBM, Armonk, New York, U.S) program version 21 Windows Microsoft. Continuous data were expressed as frequency and percentage and statistical analysis was carried out with suitable statistical tests.

Results

The statistical results of this study are summarized in the following tables.

Table 1 shows the present contraceptive use of the studied women. It was found that copper IUD was used by 33.42% of women, progestin-only pills (POPs) was used by 12.79% of women, combined oral contraceptives (COCs) was used by 11.23% of women, DMPA was used by 26.63% of women, and Implanon was used by 15.93% of women.

Table 2 shows the duration of use of the current contraceptive method of the studied women. It was found that 53.9% of women used the copper IUD for 1–3 years, 73.5% used the POPs for less than 1 year, 51.2% used the COCs for 1–3 years, 52.9% used the DMPA for 1–3 years, and 54.1% used the Implanon for 1–3 years.

Table 3 shows the pattern of menstrual cycle with copper IUD of the studied women. The duration of

menstrual blood flow was 4–5 days in 57.8% and more than 5 days in 42.2%. The amount of menstruation was moderate in 79.6% and excessive in 20.3%. The menstrual cycle was regular in 87.5% of study users and was irregular in 12.5%. Menstrual disorders were found in 42.2% of study users. In this group, dysmenorrhea was found in 68.5%, metrorrhagia in 29.6% and menorrhagia in 48.1% of these women.

Table 1 The present contraceptive use by the studied women

Type of using method	Frequency	Percent
Copper IUD	128	33.42
POPs	49	12.79
COCs	43	11.23
Depo-Provera	102	26.63
Implanon	61	15.93
Total	383	100

Table 2 Duration of using of the current contraceptive method

	Duration (years)	Frequency	Percent
Copper IUD	<1	20	15.6
	1-3	69	53.9
	>3	39	30.5
POPs	<1	36	73.5
	1-3	12	24.5
	>3	1	2.0
COCs	<1	7	16.3
	1-3	22	51.2
	>3	14	32.6
Depo-Provera	<1	24	23.5
	1-3	54	52.9
	>3	24	23.5
Implanon	<1	20	32.2
	1-3	33	54.1
	>3	8	13.1

Table 3 The pattern of menstrual cycle with copper IUD

	Frequency	Percent
Presence of amenorrhea		
Yes	0	0
No	128	100.0
Duration of menstrual blood flow (days)		
2-3	0	0
4-5	74	57.8
>5	54	42.2
Amount of menstruation		
Scanty	0	0
Moderate	102	79.6
Excessive	26	20.3
Menstrual rhythm		
Regular cycle	112	87.5
Irregular cycle	16	12.5
Menstrual disorder		
Yes	54	42.2
No	74	57.8
Type of menstrual disorder		
Dysmenorrhea	37	68.5
Metrorrhagia	16	29.6
Menorrhagia	26	48.1

Table 4 shows the pattern of menstrual cycle with POPs of the studied women. It was found that 22.4% of users were amenorrhoeic and 77.6% were regularly menstruating. The duration of menstrual blood flow in this group was 2–3 days in 5.3%, 4–5 days in 73.7% and more than 5 days in 21.0%. The amount of menstruation was scanty in 5.3% and moderate in 94.7%. The menstrual cycle was regular in 57.9% and irregular in 42.1%. Menstrual disorders were found in 42.1% in the form of polymenorrhea in 62.5% and metrorrhagia in 32.5%.

Table 5 shows the pattern of menstrual cycle with COCs of the studied women. It was found that no amenorrhea was seen with this method users. The duration of menstrual blood flow was 2–3 days in 46.5% and 4–5 days in 53.5%. The amount of menstruation was scanty in 32.6% and moderate in 67.4%. There was regular cycles in 83.7% of study users and irregular cycles in 16.3%. Menstrual disorders were found in 48.8% of study users. In this group, hypomenorrhea was seen in 66.7% and metrorrhagia in 33.3%.

Table 6 shows the pattern of menstrual cycle with DMPA of the studied women. It was found that 76.5% of users were amenorrhoeic and 23.5% were regularly menstruating. The duration of menstrual blood flow was 2–3 days in 16.7%, 4–5 days in 70.9% and more than 5 days in 12.5%. The amount of menstruation was scanty in 16.7%, moderate in 70.9%, and excessive in 12.5%. The menstrual cycle was regular in 36.4% and irregular in 58.3%. Menstrual disorders were found in 58.3%, in the form of oligomenorrhea in 21.4%, polymenorrhea in 42.9%, and metrorrhagia in 35.7%.

Table 7 show the pattern of menstrual cycle with Implanon of the studied women. It was found that 50.8% of users were amenorrhoeic and 49.2% were regularly menstruating. The duration of menstrual blood flow was 2–3 days in 16.7%, 4–5 days in 70%, and more than 5 days in 13.3%. The amount of menstruation was scanty in 16.7% and moderate in 83.3%. The menstrual cycle was regular in 53.3% and irregular in 46.7%. Menstrual disorders were found in 46.7%, in the form of oligomenorrhea in 50%, polymenorrhea in 14.9%, and metrorrhagia in 35.7%.

Discussion

Irregularity in vaginal bleeding patterns is the most common clinical side effect causing discontinuation of the method reported by the users of the newer contraceptive methods, especially hormonal ones [13].

The results of this study showed that majority of these women were used copper IUD and hormonal contraceptive for 1–3 years and this disagreed with

Table 4 The pattern of menstrual cycle with POPs

	Frequency	Percent
Presence of amenorrhea		
Yes	11	22.4
No	38	77.6
Duration of menstrual blood (days)		
2-3	2	5.3
4-5	28	73.7
>5	8	21.0
Amount of menstruation		
Scanty	2	5.3
Moderate	36	94.7
Menstrual rhythm		
Regular cycle	22	57.9
Irregular cycle	16	42.1
Menstrual disorder		
Yes	16	42.1
No	22	57.9
Type of menstrual disorder		
Polymenorrhea	10	62.5
Metrorrhagia	6	32.5

Table 5 The pattern of menstrual cycle with COCs

	Frequency	Percent
Presence of amenorrhea		
Yes	0	0
No	43	100.0
Duration of menstrual blood flow (days)		
2-3	20	46.5
4-5	23	53.5
>5	0	0
Amount of menstruation		
Scanty	14	32.6
Moderate	29	67.4
Excessive	0	0
Menstrual rhythm		
Regular cycle	36	83.7
Irregular cycle	7	16.3
Menstrual disorder		
Yes	21	48.8
No	22	51.2
Type of menstrual disorder		
Hypomenorrhea	14	66.7
Metrorrhagia	7	33.3

Jeffrey *et al.* [14], who stated that the continuation rate for IUDs is higher than the continuation rates for oral contraceptives or injectables. This disagreement may be due to individual differences regarding body response to contraceptive methods.

The results of this study showed that about two-thirds (68.5%) of women who had used IUD had complained of dysmenorrhea and 48.1% of women had menorrhagia with IUD usage. This agreed with Teal and Sheeder [15], in a prospective cohort study of teens, who chose an IUD for contraception; bleeding and pain were the two major adverse effects for which teens requested removal.

Table 6 The pattern of menstrual cycle with Depo-Provera

	Frequency	Percent
Presence of amenorrhea		
Yes	78	76.5
No	24	23.5
Duration of menstrual blood flow (days)		
2-3	4	16.7
4-5	17	70.9
>5	3	12.5
Amount of menstruation		
Scanty	4	16.7
Moderate	17	70.9
Excessive	3	12.5
Menstrual rhythm		
Regular cycle	10	41.7
Irregular cycle	14	58.3
Menstrual disorder		
Yes	14	58.3
No	10	41.7
Type of menstrual disorder		
Oligomenorrhea	3	21.4
Polymenorrhea	6	42.9
Metrorrhagia	5	35.7

Table 7 The pattern of menstrual cycle with Implanon

	Frequency	Percent
Presence of amenorrhea		
Yes	31	50.8
No	30	49.2
Duration of menstrual blood flow (days)		
2-3	5	16.7
4-5	21	70
>5	4	13.3
Amount of menstruation		
Scanty	5	16.7
Moderate	25	83.3
Excessive	0	0
Menstrual rhythm		
Regular cycle	16	53.3
Irregular cycle	14	46.7
Menstrual disorder		
Yes	14	46.7
No	16	53.3
Type of menstrual disorder		
Oligomenorrhea	7	50
Polymenorrhea	2	14.3
Metrorrhagia	5	35.7

This results revealed that POPs affect the menstrual cycle in the form of amenorrhea in 22.4% and irregular bleeding (polymenorrhea and metrorrhagia) in 42.1%. This agreed with Hoffman *et al.* [7], who mentioned that any type of bleeding irregularity can be expected with POPs, including amenorrhea, irregular spotting, or prolonged bleeding.

Regarding COCs, the findings in the present study showed that there were regular cycles in 83.7%, and menstrual disorders were found in 48.8% in the form of hypomenorrhea in 66.7% and metrorrhagia in

33.3%. These findings agreed with Datey *et al.* [13], who stated that combined low-dose oral pills, both triphasic and monophasic, produced much better cycle control as compared with any of the other hormonal contraceptives, and ~90% of combined oral pill users had normal bleeding patterns during 1 year of method use.

This is also agreed with Hatcher *et al.* [5] and Speroff and Darney [6], who reported that unscheduled bleeding is common during the first 3–6 months (30–50% of women initiating) of COC use and decreases over time (10–30% of women by the third month of use).

The results of this study showed that among the acceptors, 76.5% developed amenorrhea with DMPA, and irregular bleeding was seen in 58.3% (oligomenorrhea in 21.4%, polymenorrhea in 42.9%, and metrorrhagia in 35.7%).

These findings were supported by Edra Spevack [16], who stated that with DMPA use, most women experienced changes in their bleeding pattern, such as infrequent or prolonged bleeding and spotting. However, up to 70% of women will have amenorrhea after 1 year.

This disagreed with Njoku *et al.* [17], who reported that amenorrhea was reported by 47.7% of the clients. The other disturbances of menstruation include hemorrhagic in 3.2%, and irregular menstruation/intermenstrual spotting occurred in 22.8%. This disagreement may be owing to the differences in the duration of using of this method.

The results of this study showed that among the acceptors, 50.8% developed amenorrhea with Implanon, and irregular bleeding in 46.7% (oligomenorrhea in 50%, polymenorrhea in 14.9%, and metrorrhagia in 35.7%).

These findings were supported by Wylie [11], who reported that almost 50% irregular bleeding with Implanon users, but he reported a much lower incidence of amenorrhea (20%). The results were in contrast to the study by Gezginck *et al.* [18], who reported less incidence of irregular bleeding per vaginum (17.5%), but they reported an incidence of amenorrhea of 41.25%.

However, the study by Pushpa *et al.* [19] reported irregular bleeding per vaginum in 27% cases. Prolonged spotting was reported in 23% of cases, and 24% of cases complained of amenorrhea. Polymenorrhagia was observed in 22.5% of cases.

The differences in the results of this study and other studies were explained by Darney *et al.* [20], who reported that widespread changes in bleeding patterns were found in ENG implant users but that no one pattern predominated.

In this study, 24.8 and 18.1% of women had discontinued copper IUD owing to bleeding and dysmenorrhea, respectively, and this agreed with Mosher *et al.* [21], who stated that although current IUDs are very safe and effective, they are not suitable for all women.

The results of this study showed that 37.8, 2.2, and 15.6% of women had discontinued POPs owing to bleeding, amenorrhea, and forgot it, respectively. In the present study, 2.6, 2.6, and 23.1% of women had discontinued COCs owing to bone pain, hypomenorrhea, and forgot it, respectively.

These findings were supported by Lei *et al.* [22] and Rosenberg *et al.* [23], who reported that hormonal contraceptives in general are characterized by both poor adherence and relatively high discontinuation rates; the latter is mainly owing to the hormonal adverse effects.

This study showed that 22.2, 6.2, and 18.5% of women had discontinued DMPA owing to bleeding, bone pain, and amenorrhea, respectively. Finally, the findings of this study reported that women had discontinued Implanon owing to bleeding in 28.6% and owing to amenorrhea in 14.3%. This agreed with Datey *et al.* [13], who stated that women having frequent or prolonged bleeding had discontinued the contraceptive method more often as compared with those having delayed bleeding episodes or oligomenorrhea.

Conclusion

This study concluded that hormonal contraceptive methods and IUD can affect the pattern of menstrual cycle and are considered risk factors for irregularity in vaginal bleeding patterns and discontinuation of the method.

Recommendations

Counseling should be given for women by doctors and nurses about various family planning methods and adverse effects to decide what the best method is for her according to her health status before using any contraceptive method.

It is encouraged to have studies to predict good management of menstrual irregularity with contraceptive methods and also studies to produce other contraceptives with no or at least little adverse effects.

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Conflicts of interest

There are no conflicts of interest.

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