

Melasma severity and use duration among hormonal injection contraception users: a study in a puskesmas in Semarang

Tjatur Sembodo^{1*}, Hesti Wahyuningsih Karyadini¹, Nurul Elvira Thamrin¹

Abstract

Purpose: This study examines the relationship between the duration of use of injected hormonal contraception and the severity of melasma. **Method:** This cross-sectional study interviewed 60 users of one-month and three-month injection contraception through a consecutive sampling in Semarang's Bangetayu Community Health Center in January 2020. Melasma severity is based on face photo-taking and assessed with Melasma Area and Severity Index. **Results:** Spearman's test showed no relationship between one-month injection contraception use has no relationship with melasma severity ($p = 0.357$, $p > 0.05$). A similar finding was found in the three months of injection contraception users ($p = 0.795$, $p > 0.05$). **Conclusion:** Use of injected contraception, whether one or three-month duration, has nothing to do with melasma severity. Injectable contraceptives users should not worry about melasma.

Keywords: melasma; 1-month injection contraception; 3-month injection contraception

Submitted:

March 23th, 2020

Published:

April 25th, 2020

¹ Division of Public Health Sciences, Faculty of Medicine Sultan Agung Islamic University, Semarang

*Corresponding author: tjatursembodo@gmail.com

INTRODUCTION

Reproduction rights include certain human rights that are already listed in national laws, international human rights and various other related consensus documents. Reproductive and sexual health services, including providing information and family planning services, are not only seen as the primary interventions to improve the health of women and children but also as human rights. Every individual has the right to access, choose, and benefit from scientific development in determining family planning methods [1,2].

Contraception reduces the population number and improves the health of mothers and children. There are many methods of contraception available,

both hormonal and non-hormonal contraception [3,4]. Based on types of contraception choice, most of the active birth control participants chose injections and pills (over 80%) compared to other methods; injections (63.71%) and pills (17.24%) [5]. Apart from the success or the benefits gained from the use of hormonal contraception, it has side effects for long time use, including melasma [4]. Every three months injection of Depo Provera (6-alpha-medroxyprogesterone) for parenteral contraceptives has a strong progesterone effect. These drugs include depot drugs, injecting every one month containing two kinds of progestin and estrogen hormones such as natural hormones in the female body also referred to as combined injection

contraception, preparations used are medroxyprogesterone valerate [6].

Melasma is one of the pigmentation disorders because of an increase in the amount of melanin in the epidermis and dermis as brown, gray, or irregular blue spots on the face and neck [7]. Although the pathogenesis of this disease is not clear, genetic and hormonal factors and UV radiation are important as a trigger [8]. Pigmentation disorders included in the third most common complaint in dermatology, one of which is melasma, can occur in all ethnic groups, melasma is predominant in Asian, Hispanic, and African descent [9]. The highest incidence in women with melasma is 30-44 years [10].

The use of hormonal contraceptive combinations in both pills and injections can influence melasma. However, severity caused is different. The emergence of melasma in hormonal contraceptive users such as combination pills and combination injections is caused by estrogen and progesterone accumulation in the body. Estrogen in contraception can play a direct role in melanocytes receptors, which affect skin pigmentation. In contrast, the effect of the progesterone in hormonal contraception can affect melanin to increase its spread in cells [4].

As far as the literature search that the author did, no studies document the length of use of injection contraception one month and three months with the severity of melasma. Existing studies only compare the duration of hormonal contraceptive use (oral or combined injection) with melasma incidence. Based on 97 users of depo medroxyprogesterone acetate (DMPA) injection, Dewi found chloasma in 38 people (39.2%) [11].

Using combined injectable hormonal contraception has a greater risk of causing melasma compared to the use of combination pills, with a risk that is three times more at risk of developing melasma with a duration of use > 6 months [4]. The highest prevalence of melasma was found in using injectable type hormonal contraception for 3 months, 10 occurrences of melasma (47.6%). The prevalence of melasma found in other types of hormonal contraception is: 1 month injection and pill each of 2 melasma events (9.5%). For implant types there are 3 events of melasma (14.3%) [12].

The problem of side effects of injection contraception, melasma, provides a perception effect that is not good for acceptors. Besides, the results of existing studies of the use of injection contraception and melasma still show mixed results, which allows

negative perceptions to occur. Injecting contraceptive users are the most contraceptive users. Acceptors can be doubtful because of the side effects of injection contraception, which can reduce the number of family planning acceptors. WHO states that providing family planning information and services show the appreciation of women's rights in choosing and understanding the benefits and side effects of contraception of their own choice and were not seen as the technical intervention. So research is needed to analyze further the effect of using Hormonal Contraception Type of Injection with Melasma Severity.

METHODS

This cross-sectional study interviewed 60 users of one-month and three-month injection contraception through a consecutive sampling in Semarang's Bangetayu Community Health Center in January 2020. Melasma severity is based on face photo-taking and assessed with Melasma Area and Severity Index.

The length of use of injectable hormonal contraception 1 month and 3 months taken from the length of use of contraception in the month number obtained from the interview, with an interval scale. Melasma severity is assessed by Melasma Area and Severity Index (MASI score). The score is based on skin specialist diagnosis (from the Skin Center of Sultan Agung Islamic Hospital Semarang) of respondent face photo taking from the front, right side, and left side.

The target population is women who use contraception, the specific population is women who use injection contraception recorded at the Puskesmas Bangetayu Semarang, samples are women who use contraceptive injections one month and three months, Inclusion criteria comprised native Indonesian citizens (indigenous), women who suffer melasma, and using injectable hormonal contraception for 1 or 3 months. Exclusion criteria included women who used whitening creams, using Vit injections, has a family history of suffering from melasma, uses sunscreen, and uses drugs such as diphenyl hydantoin, mesantion, chlorpromazine, cytostatic and minocycline. The sample size in this study was 60 participants taken using the consecutive sampling method. Data collection was carried out in January 2020. Data analysis to determine the difference between the use of hormonal contraception for one month and three months injections with the severity of Melasma was used analysis Mann-Whitney [13] to analyze the relationship between duration of use of hormonal contraception for

one month and 3 months with the severity of melasma using Spearman test [14].

RESULTS

Data on MCH clinics of Puskesmas Bangetayu Semarang from the January-September 2019 period showed that injection contraception users visit occupy the top of the list, 218 participants both injecting every 1 month and 3 months. Most of the participants belonged to the age group 22-45 years old.

Table 1 shows the duration of contraceptive use and the severity of Melasma. From the 1-month injection contraception users group, 9 (30%)

participants had been using the method for 49-60 months; 27 (90%) developed mild melasma and 3 (10%) developed moderate melasma. Meanwhile, from the 3-month injection contraception group, 10 (33.33%) participants had been using the method for 97-108 months. Most of the 3-month injection contraceptive users developed moderate melasma (70%), followed by mild melasma (33%), and severe melasma (6.67%). The relationships one month family planning injections use with melasma severity p-value = 0.795 ($p > 0.05$). The time using 3 month contraceptive injections with the severity of melasma were not related.

Table 1. Length of use of 1-month and 3-month injection contraception and the severity of Melasma

Length of use the one month injection (Month)	Melasma Severity						Total	%
	Light		Medium		Heavy			
	n	%	n	%	n	%		
1 - 12	2	6.67	0.0	0.0	0.0	0.0	2.0	6.7
13 - 24	2	6.67	0.0	0.0	0.0	0.0	2.0	6.7
25 - 36	5	16.67	0.0	0.0	0.0	0.0	5.0	16.7
37 - 48	6	20	0.0	0.0	0.0	0.0	6.0	20.0
49 - 60	7	23.33	2.0	6.7	0.0	0.0	9.0	30.0
61 - 72	2	6.67	0.0	0.0	0.0	0.0	2.0	6.7
73 - 84	1	3.33	0.0	0.0	0.0	0.0	1.0	3.3
85 - 96	1	3.33	0.0	0.0	0.0	0.0	1.0	3.3
97 - 108	0	0	1.0	3.3	0.0	0.0	1.0	3.3
109 - 120	1	3.33	0.0	0.0	0.0	0.0	1.0	3.3
	27	90	3.0	10.0	0.0	0.0	30.0	100.0
Length of use of the three month injection (month)								
1 - 12	0	0	1.0	3.3	0.0	0.0	1.0	3.3
13 - 24	0	0	0.0	0.0	0.0	0.0	0.0	0.0
25 - 36	0	0	1.0	3.3	0.0	0.0	1.0	3.3
37 - 48	0	0	1.0	3.3	0.0	0.0	1.0	3.3
49 - 60	2	6.67	1.0	3.3	1.0	3.3	4.0	13.3
61 - 72	0	0	4.0	13.3	0.0	0.0	4.0	13.3
73 - 84	1	3.33	1.0	3.3	0.0	0.0	2.0	6.7
85 - 96	1	3.33	5.0	16.7	0.0	0.0	6.0	20.0
97 - 108	3	10	6.0	20.0	1.0	3.3	10.0	33.3
109 - 120	0	0	1.0	3.3	0.0	0.0	1.0	3.3
	7	23.33	21.0	70.0	2.0	6.7	30.0	100.0

Table 2 shows the duration of both 1-month and 3-month injection contraception use and melasma

severity, The mean rank for 1-month injection contraception users (21.17) was lower than the mean

rank of the 3-month injection contraception users (39.83) with p value = 0,000 (p <0.05). Therefore, in terms of the duration of contraception use, there were significant mean differences between 1-month and 3-month injection contraception.

Meanwhile, the difference in melasma severity between 1-month and 3-month injection contraception, mean rank or the average rating of each group for 1-month contraception is 20.40, lower than the average rating of 3 months group of injection contraception (40.60, p = 0.000, p <0.05). Melasma severity showed significant mean differences between types of injection contraception 1 month and 3 months.

Table 2. Relationship between the duration of both 1-month and 3-month injection contraception use and melasma severity

Type of Injection Contraception	Duration		Melasma severity	
	Mean Rank	p	Mean Rank	p
1-Month	21.17	0,000	20.40	0,000
3-Month	39.83		40.60	

Last but not least, as shown in Table 3, the duration of 1 month injection contraceptive use and melasma severity were not significantly associated (p = 0.357, p> 0.05). Likewise, there was no significant relationship in the duration of 3 months of injection contraceptive use and the severity of melasma (p = 0.795, p> 0.05).

Table 3 Relationships family planning injections use with Melasma Severity

Length of family planning injections use	Severity Melasma	
	r	p
1-month	0.295	0.357
3-month	-0.046	0.795

DISCUSSIONS

Our findings were in line with some previous studies. Jannah, Ariani and Sariati’s study [4] found that the use of 1-month injection contraception exerted mild melasma, while the 3-month injection contraception exerted medium melasma. They also stated that the 3-month injection contraception had more risk of

causing severe melasma due to the progesterone. Each contraceptive has progestagen medroxyprogesterone (MPA150 mcg) [15].

On the other hand, Mahdalena, Jusuf and Putra’s study [16] found that there was no relationship between the length of hormonal contraceptive use and the level of estradiol in blood serum, which was also in line with our study. Another study by Miranti [17] showed a similar result that there was no significant correlation between estradiol levels and melasma. An in-vitro test conducted by Wiedemann et al. [18], stated that the hormone progesterone derived from contraception can reduce the risk of melasma because progesterone decreases proliferation without affecting tyrosinase activity.

Therefore, there are two implications of this study. First, the choice of injection contraception influenced melasma severity, with the 3-month injection contraception correlated with worse severity. However, our second finding confirmed that there was no correlation between the

There is a significant difference between the severity of melasma in using 1 month injection contraception and 3 months injection with the average injection rate of 3 months greater than 1-month injection. This is in line with Jannah, Ariani and Sariati [4], which states that most use of 1 month injection contraception is in the mild category. Meanwhile, most 3-month injection contraception in this study was in the medium category. 3-month injection contraception has more risk of causing severe melasma because of progesterone. Each contraceptive has progestagen medroxyprogesterone (MPA150 mcg) [15].

While one month injection contraception contains a combined progesterone and estrogen hormones (25 mg depo progesterone acetate and 5 mg estradiol [19]. Progesterone hormone levels in 1 month injection contraception are higher than 3-month contraception, progesterone hormone derived from contraception can reduce the risk of melasma because progesterone decreases proliferation without affecting tyrosinase activity, contrary to the effect of estrogen stimulation on melanocytes [18] in 3-month contraception found most melasma in the medium category, it can be explained that the severity of melasma is also related to estrogen levels in the body [20]. Estrogen can stimulate melanogenesis in human melanocyte cultures by inducing synthesis of tyrosinase, tyrosinase-related protein-1 (Trp-1), and Trp-2 and tyrosinase activity in normal human melanocyte development. An increase

in estrogen in the body speeds up the melanogenesis process [4].

Besides melasma, side effects on users of 3-month injection contraception are weight gain; weight gain is likely because of the hormone progesterone in converting carbohydrates and sugars into fat (Dewi, 2018). In women who have a high body fat with an increased production of androstenedione, androgen sex hormones are used to produce estrogen with the help of the aromatase enzyme. More estrogen production helps melasma develop [21].

This study shows no significant correlation between the length of injection using contraception 1 month and 3 months with the severity of melasma. 1 month injection contraception contains a combined progesterone and estrogen in the form of depo medroxyprogesterone acetate in levels of 25 mg and estradiol 5 mg [19]. The results are in line with Mahdalena, Jusuf and Putra's study [16], who examined serum estradiol levels with the length of hormonal contraceptive use, which was found to have no meaningful relationship. Another study also found an increase in estradiol levels in women with melasma but in a statistical test found no significant relationship between estradiol levels with women suffering from melasma [17]. The contraceptive injection 3 comprises progesterone hormone, in the form of MPA150, medroxy-progesterone acetate [15]. In vitro test conducted by Wiedemann et al. [18], states that the hormone progesterone derived from contraception can reduce the risk of melasma because progesterone decreases proliferation without affecting tyrosinase activity. The study analysed the effects of progesterone and chlormadinone acetate on melanocytes, as compared to estrogen. Experiments using progesterone (100 nM) and CMA (100 nM) reduced the proliferation rate by 38% and 27%. Pigmentation activity is stimulated by 17 β -estradiol, whereas progesterone does not affect tyrosinase activity.

Melasma in Indonesia is more common in women than men, with a ratio of 24:1. Melasma can be found in women of childbearing age with a history of direct exposure to UV rays, found in pregnant women, those using hormonal contraception, cosmetics, or drugs [10]. The prevalence of melasma in Latin women is 4-10% and increases to 50% in pregnant women, whereas in Southeast Asian women, the prevalence reaches 40%. Male patients are only 10%, but in Latin men, it increases to 14.5% of all cases of melasma. Melasma can affect all racial groups, but more often in skin types IV-VI and live in areas with high ultraviolet (UV)

radiation, such as Hispanic/Latin and Asian [7]. Indonesian skin types include type IV-V in Fitzpatrick's skin six phototype classification so they are at risk of developing melasma [22]. In this research, race and causes of melasma were controlled, including exposure to sunlight, the use of cosmetics, family history of melasma, and drugs. However, the results turned out to be no significant relationship, either in 1 month or 3 months injections. Users of injectable contraception need not worry about its effect on the severity of melasma.

CONCLUSION

There is a significant difference between the severity of melasma in using 1 month and 3 months injectable contraception with the average injection rate of 3 months, which is greater than 1 month injection. The length of use of 1 month injection contraception does not correlate with the severity of melasma. More importantly, no significant relationship was found between the length of use and the severity of melasma in 3-month injection contraception users. Estradiol content in one-month injection and progesterone in the three months injection reduces melasma occurrence. The confounding factors such as exposure to sunlight, use of cosmetics, drugs, and respondents who have a family history of melasma, as well as the frequency of contraceptive use both for injections 1 month or 3 months, require special attention to be followed up in multivariate research. As long as not exposed to confounding factors, injection contraception users should not worry about its effect on melasma severity.

REFERENCES

1. Rekomendasi Praktik pilihan untuk penggunaan kontrasepsi. EGC;
2. Selected Practice Recommendations for Contraceptive Use. Geneva: World Health Organization; 2017.
3. Udiani AA. Hubungan Penggunaan Kontrasepsi Oral Dengan Kejadian Melasma Di Desa Ngebrak Kecamatan Gentan. s1, Universitas Muhammadiyah Surakarta. 2012.
4. Jannah FW, Ariani D, Sariati Y. Hubungan Kejadian Melasma dengan Penggunaan Kontrasepsi Hormonal Suntik dan Pil Kombinasi di BPM Dwi Astutik, Desa Petungsewu, Dau, Kabupaten Malang. *Journal of Issues in Midwifery*. 2019;2: 17–29.
5. Ministry of Health. Indonesia Health Profile 2018.

- Jakarta: Jakarta: Ministry of Health Republic of Indonesia; 2019.
6. Affandi, B. and Albar, E. Contraception. Jakarta: PT Bina Pustaka Sarwono Prawirohardjo; 2011.
 7. Umborowati MA, Rahmadewi R. Studi Retrospektif: Diagnosis dan Terapi Pasien Melasma. *Berkala Ilmu Kesehatan Kulit dan Kelamin*. 2014;26: 1–8.
 8. Setyawati, N. Kadek, Indira, IGAAE and Puspawati, NMD. Incident and Melasma Profile at Sanglah Central General Hospital Denpasar Period January 2014 to December 2014. *E-Journal of Medika*. 2019;8: 1–7.
 9. Cestari T, Peruzzo J, Giongo N. Definition, Incidence, and Etiology of Melasma in Brown Skin. In: E. H, Enriquez-Macarayo M, editors. *Melasma and Vitiligo in Brown Skin*. New Delhi: Springer; 2017. pp. 13–19.
 10. Soepardiman, I. Pigment Disorders. In: A. Menaldi, K. Bramono, and W Indriatmi, editor. *Skin Disease and Gender*. Jakarta: FK UI Publishing Agency; 2015. p. -.
 11. Dewi ADC. Gambaran efek samping kb suntik depo medroksi progesteron asetat pada akseptor. *Jurnal 'Aisyiyah Medika*. 2018;2. doi:10.36729/jam.v2i1.68
 12. Siagian A. Hubungan Antara Penggunaan Kontrasepsi Hormonal dengan Kejadian Melasma. 2017 [cited 19 Sep 2020]. Available: <http://repositori.usu.ac.id/handle/123456789/20324>
 13. Santoso, S. SPSS, Processing statistical data in a professional manner. Jakarta: PT Elex Media Komputindo; 2001.
 14. Sopiudin D. Gateway to understanding statistics, methodology, and epidemiology. Ciracas: Seto Corn; 2013.
 15. Tjay, TH and Rahardja, K. Important Drugs The Efficacy, Usage, and Side Effects. Jakarta: Elex Media Komputindo; 2013.
 16. Mahdalena I, Jusuf N, Putra I. Melasma characteristic in hormonal contraceptive acceptors at Kelurahan Mangga Kecamatan Medan Tuntungan, Medan-Indonesia. blog.balimedicaljournal.org. Available: <https://blog.balimedicaljournal.org/index.php/bmj/article/view/1000>
 17. Miranti A, Anwar AI, Djawad K, Patellongi I, Wahab S, Abdullah N. Analysis level of serum estradiol hormone of pregnant women with melasma. *American Journal of Clinical and Experimental Medicine*. 2016;4: 26–29.
 18. Wiedemann C, Nägele U, Schramm G, Berking C. Inhibitory effects of progestogens on the estrogen stimulation of melanocytes in vitro. *Contraception*. 2009;80: 292–298.
 19. Harini R. Differences in the Influence of the Use of Injecting Contraception (Cyclofem and Depoprogestin) on Increased Blood Pressure in Fertile Age Women in the Work Area of Pakisaji Public Health Center Malang. *Journal of Nursing*. 2010;1: 144–150.
 20. Damayanti DS, Pratiwi PI, Petricka G. The correlation among duration of oral contraception with the incidence of melasma in sumberwudi, lamongan, East Java, Indonesia. *Proceedings of the International Conference on Applied Science and Health*. 2017;0: 223–227.
 21. Novitasari I. Relationship of Fat Intake and Nutrition Status with Menstrual Cycles in High School Students Colomadu. Ririn Yuliati And Luluk, editor. Bachelor, Universitas Muhammadiyah Surakarta. 2016.
 22. Rizqiyana A. Hubungan Antara Kehamilan Trimester III Dengan Terjadinya Melasma Di RSUD Salatiga. s1, Universitas Muhammadiyah Surakarta. 2012.