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THE RELATIONSHIP BETWEEN THE USE OF INJECTABLE HORMONAL CONTRACEPTION AND THE INCIDENCE OF MELASMA IN WOMEN AGE 30-50 YEARS OLD AT SURANTIAH COMMUNITY HEALTH CENTER PESISIR SELATAN 2024-2025

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Abstract
Ultraviolet light exposure and hormonal imbalances have been identified as the main causes of melasma. The use of hormonal contraceptives is also suspected to be a risk factor for melasma, through an imbalance of estrogen and progesterone hormones, which triggers increased skin pigmentation. Aims of this research to determine the relationship between the use of injectable hormonal contraceptives and the incidence of melasma in women aged 30-50 years old at the Surantiah Pesisir Selatan Community Health Center in 2024-2025. This study was an observational analytic study. The accessible population was women aged 30-50 years old using 1-month and 3-month injectable contraceptives who visited the Surantiah Pesisir Selatan Community Health Center between November 2024 and July 2025. The sampling technique used was purposive sampling. Univariate data analysis was presented in the form of frequency distributions, while bivariate analysis used the chi-square test. Data processing was performed using the computerized SPSS program IBM version 25.0. The highest age was 35-39 years old, namely 18 people (26.9%), the highest use of hormonal contraceptives was injectable progestin injections (3 months), namely 46 people (68.7%), the highest incidence of melasma was mild, namely 28 people (41.8%), the highest duration of use was 1-3 years and >3 years, namely 32 people (47.8%) and there is the relationship between the use of injectable hormonal contraceptives and the incidence of melasma in women aged 30-50 years old at the Surantiah Pesisir Selatan Community Health Center in 2024-2025 (p=0.022). There is the relationship between the use of injectable hormonal contraceptives and the incidence of melasma in women age 30-50 years old at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Keywords: *Age, Injectable Hormonal Contraceptives, Duration of Use, Melasma Incidence*

INTRODUCTION

Family planning is a structured effort to regulate pregnancies in order to create a prosperous and harmonious family. Family planning policies are formulated in response to the dynamics of population growth that need to be controlled. Failure to participate in family planning programs has the potential to negatively impact family well-being, particularly economic aspects, as the number of unplanned children can significantly increase household expenses.[1]

The family planning (KB) program is seen as a strategic intervention in reducing maternal mortality, especially in groups with 4T risk factors, namely giving birth at too young an age (less than 20 years), giving birth too often, having births too closely spaced, and giving birth at too old an age (more than 35 years). In addition, through the implementation of the KB program, it is hoped

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that the quality of family life can be improved, thereby creating a sense of security, peace, and optimism for a better future in order to achieve physical well-being and inner happiness.[2]

Based on data from the Central Statistics Agency (BPS) in 2024, the proportion of women aged 15–49 years who were married and used contraceptives was recorded to have increased, namely from 55.06% in 2021 to 55.36% in 2022, and then increased again to 55.49% in 2023. A similar trend occurred in West Sumatra Province, where the rate increased from 55.07% in 2021 to 55.60% in 2022 and reached 56.09% in 2023.[3]

The most commonly used contraceptive method in Indonesia is the injectable (14.75%), followed by the pill (5.38%), the implant (3.79%), and the Male Surgical Method with the lowest prevalence at 0.13%. A similar pattern was found in West Sumatra Province, where injectable contraceptives were used by 48.13% of users, while male surgical method use was the lowest at 0.45%.[3] And based on data from the Central Statistics Agency of Pesisir Selatan Regency in 2022, the most common KB acceptors were injections (708 acceptors), implants (560 acceptors), pills (203 acceptors) and the fewest types of KB acceptors were male surgical method (5 acceptors).[4]

This type of injectable hormonal contraception is becoming increasingly popular due to its perceived effectiveness, convenience, relative affordability, and good safety profile. In addition to its role in reducing pregnancy rates, hormonal contraception is also known to offer non-contraceptive benefits, such as relieving pain from menstrual cramps, *endometriosis, adenomyosis, menstrual migraine*, and helps manage the symptoms of premenstrual syndrome. This contraceptive can also be beneficial in the management of dermatological conditions, including seborrhea, acne, hirsutism, and alopecia.[5]

Although effective, the use of hormonal contraception can be accompanied by a number of side effects. Mild side effects often reported include nausea, cephalgia, weight gain, breakthrough bleeding/spotting, and emotional instability. Furthermore, more serious side effects, such as cardiovascular and hepatobiliary system disorders and hypertension can also occured. One potential side effect of contraceptive use is the hyperpigmented skin condition (melasma). Melasma typically appeared in injectable contraceptive users between 6 and 24 months of use.[5]

Melasma is a form of skin hyperpigmentation characterized by increased melanin production, causing the skin to appear darker. This condition typically appears on sun-exposed areas, especially the face. Histopathologically, melasma is characterized by excessive accumulation of melanin in the epidermis.[6] Melasma is also an acquired hypermelanosis which is usually symmetrical, can appear as light brown to dark brown macules, with a confluent or scattered distribution and attacks areas exposed to ultraviolet light.[7] Hyperpigmentation in melasma is generally distributed symmetrically with irregular edges.[8]

Melasma can be found in all races, but is more common in individuals with Fitzpatrick skin types IV and V, as well as in populations living in areas with high ultraviolet radiation exposure, such as Hispanic/Latino and Asian groups.[8] This condition generally affects adults aged 30–55 years and is more common in women. The higher incidence in women is associated with the role

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of the hormones estrogen and progesterone and their increase during pregnancy, which stimulates melanogenesis.[9]

The prevalence of melasma in Indonesia is around 4% of all skin disease cases. The ratio of melasma incidence in Indonesia between women and men is reported to be 24:1.[9] Epidemiological data from the Cosmetic Dermatology Polyclinic of the University of North Sumatra Hospital for the period 2020-2022 reported that out of a total of 1,793 patient visits, 8.9% or 159 patients had melasma.[10] Research data from Oktaviana M, et al in 2019 at the Dermatology and Venereology Polyclinic of Dr. M Djamil Padang Hospital during January 2015-December 2017 found a melasma incidence of 0.75% of 59 patients examined, 96.61% of whom were women, the majority occurring in the age group 24 to <44 years (49.16%), and the epidermal type was found in 20 patients (33.90%), who were examined with a Wood's lamp.[11]

The etiology of melasma remains unknown. Several causative factors are suspected to play a role in its pathogenesis, including genetic predisposition, race, the use of certain cosmetic ingredients, medications (especially antibiotics), nutritional deficiencies, and idiopathic factors. Exposure to ultraviolet light and hormonal imbalances have been identified as key factors. The use of hormonal contraceptives is also suspected to be a risk factor for melasma, through an imbalance of sex hormones, particularly estrogen and progesterone, which triggers increased skin pigmentation.[12]

According to Muslimah et al., melasma in hormonal contraceptive users is caused by the accumulation of the contraceptive hormones estrogen and progesterone contained in the contraceptive. This can lead to a build up in the body. These two hormones are interrelated and interact to influence cell pigmentation through their direct action on melanocytes, which act as target receptors. Currently, official data on melasma prevalence, both nationally and internationally, is not available.[9]

A number of previous research showed a significant association between the use of injectable contraceptives and the incidence of melasma. Research by Amaliyah (2021) identified that 54.1% of respondents who used injectable contraceptives experienced melasma.[13] Another study conducted by Pramedisca (2022) also found a significant association between the history of hormonal contraceptive use, especially injectables, with the severity of melasma, namely in 50% of respondents.[14] Similar findings were reported by Karomah (2019) in West Sumatra, who examined the relationship between the duration of 3-month injectable contraceptive use and the incidence of melasma in the work area of the Plus Mandiangin Community Health Center, Bukittinggi City.[15]

METHODS

This study is an analytical observational study. The accessible population in the study were 67 women aged 30-50 years old who used 1-month and 3-month injectable contraceptives who visited the Surantiah Pesisir Selatan Community Health Center between November 2024 and July 2025 using a purposive sampling technique. Univariate data analysis was presented in the form of frequency distributions, while bivariate analysis used the chi-square test. Data processing was performed using the computerized SPSS program IBM version 25.0.

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RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Respondents Using Injectable Hormonal Contraception in Women Aged 30-50 Years Old Based on Age at the Surantiah Pesisir Selatan Community Health Center in 2024-2025

Age	*f*	%
30-34 years old	16	23.9
35-39 years	18	26.9
40-44 years old	17	25.4
45-50 years	16	23.9
Total	67	100.0

Based on table 1, it can be concluded that of the 67 respondents, the largest age was 35-39 years, namely 18 people (26.9%).

Table 2. Frequency Distribution of Hormonal Contraceptive Use Based on Injection Type in Women Aged 30-50 Years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025

Use of Injectable Hormonal Contraceptives	*f*	%
Combination Injection (1 month)	21	31.3
Progestin Injection (3 months)	46	68.7
Total	67	100.0

Based on table 2, it can be concluded that of the 67 respondents, the most common type of hormonal contraceptive use based on injection was progestin injection (3 months), namely 46 people (68.7%) compared to the use of combination injection hormonal contraceptives (1 month), which was only 21 people (31.3%).

Table 3. Frequency Distribution of Melasma Incidence in Women Aged 30-50 Years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025

Melasma Incidence	*f*	%
No Melasma	18	26.9
Mild	28	41.8
Moderate	16	23.9
Severe	5	7.5
Total	67	100.0

Based on table 3, it can be concluded that of the 67 respondents, the most common occurrence of melasma was mild melasma in 28 people (41.8%) of respondents who were registered as injectable contraceptive patients at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Table 4. Frequency Distribution of Duration of Use of Injectable Hormonal Contraceptives in Women Aged 30-50 Years at the Surantiah Community Health Center in Pesisir Selatan in 2024-2025

Duration of Use	*f*	%
<1 year	3	4.5
1-3 years	32	47.8
>3 years	32	47.8
Total	67	100.0

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Based on Table 4, it can be concluded that of the 67 respondents, 32 (47.8%) had used injectable hormonal contraception for more than 1-3 years and more than 3 years. Three (4.5%) had used it for less than 1 year.

Table 5. Relationship between the Use of Injectable Hormonal Contraceptives and the Incidence of Melasma in Women Aged 30-50 Years at the Surantiah Community Health Center in South Pesisir, 2024-2025

Injectable Contraceptives	Melasma Occurrence						P value
	No Melasma		Melasma		Total		
	f	%	*f*	%	*f*	%	
Combination Injection (1 month)	10	47.6	11	52.4	21	100.0	0.022
Progestin Injection (3 months)	8	17.4	38	82.6	46	100.0	
Total	18	26.9	49	73.1	67	100.0	

Based on table 5, it can be concluded that the most cases of melasma occurred with the use of progestin injections (3 months), namely 38 people (82.6%) compared to combination injections (1 month), namely 11 people (52.4%). Test results statistics using the chi square test obtained p value of 0.022 ($p<0.05$) which means there is the relationship between the use of injectable hormonal contraceptives and the incidence of melasma in women aged 30-50 years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Based on the research results from 67 respondents, the highest age was 35-39 years, namely 18 people (26.9%) in women aged 30-50 years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Previous research conducted by Astria (2023) on the Duration of Use and Age with the Incidence of Side Effects of Depomedroxy Progesterone Acetate (DMPA) Progestin Contraceptives in Women of Childbearing Age in Sidolego Village, Tabir Lintas Health Center Working Area, Merangin Regency in 2022 obtained the results that the age of the most respondents was 20-35 years, namely (56.5%) and also research conducted by Nugroho in 2025 on the Relationship between the Duration of Use of Progestin Injection Contraceptives and the Menstrual Cycle in Women of Reproductive Age at Kinali Health Center, West Pasaman Regency obtained the results that the most age was 20-35 years, namely (57.14%).[16,17]

The age group of 20–35 is the optimal reproductive period, characterized by high levels of physiological activity and increasing socioeconomic stability. During this phase, individuals have generally entered or achieved career stability, have permanent employment, and are beginning to plan for family and financial matters, thus increasing the likelihood of considering contraceptive use.[18]

The highest fertility rate occurs between the ages of 20 years and 29 years, with a pregnancy probability of approximately 95%. It then decreases to approximately 5% after the age of 30 years, and at the age of 50 years, the chance of pregnancy is estimated to be only around 10%. Therefore, the majority of contraceptive users are in the age group above 30 years, with the goal of delaying or terminating pregnancy. Ages over 35 years are categorized as advanced reproductive age, where pregnancy can increase the risk of maternal morbidity and obstetric complications, and are therefore clinically inadvisable.[19,20]

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Researchers interpreted that the majority of respondents were between the ages of 30 years and 50 years, an active reproductive phase where conception potential is still high, leading to the use of contraception, particularly injectable methods, to delay pregnancy. During this period, individuals have generally achieved economic stability, enabling more rational and informed decisions regarding family planning and optimal access to reproductive health services, including contraception. However, the most common side effect of injectable hormonal contraception is hyperpigmentation or melasma.

This is in accordance with the theory that during reproductive age, particularly between 30 and 50 years, the skin's ability to regenerate epidermal cells and regulate melanin distribution begins to decline. Melanocytes (pigment-producing cells) remain active, but the mechanisms of melanogenesis controlling are weaken, making exposure to exogenous hormones (from injectable contraceptives) more likely to cause permanent hyperpigmentation.[20]

Based on the research results from 67 respondents, the most common use of injectable hormonal contraception was progestin injections (3 months), namely 46 people (68.7%) in women aged 30-50 years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Previous research conducted by Rahmawati in 2024 on the Effect of Types of Injectable Contraceptives and Duration of Use on Weight Gain in Women of Childbearing Age at the X Bugel Midwife Clinic in Kedung Jepara obtained research results showing that the type of 3-month injectable contraceptive was (50%) of respondents and a 2023 Muslimah study on the Level of Melasma Incidence Due to the Use of Hormonal Contraceptives at the Tlogosari Kulon Community Health Center obtained research results showing the use of 3-month injectable contraceptives was (71.8%). [9,21]

The majority of injectable contraceptive users choose the 3-monthly injection method due to recommendations from health workers, partner support, its practicality and efficiency, and concerns about using other contraceptive methods. Husband support in reproductive health decision-making is the result of a complex interaction, involving communication processes that influence satisfaction and consistency in contraceptive use.[22]

Research by Harahap (2021) shows that the 3-monthly injectable contraceptive is the most popular choice, especially among lower-middle socioeconomic groups, due to its lower cost, high effectiveness, and minimal estrogen-related side effects. High satisfaction rates encourage long-term use and reduce the likelihood of switching to other contraceptives.[23]

Based on these findings, researchers concluded that preference for the 3-month injectable contraceptive was higher than the 1-month injectable, even though both are easy to use and relatively inexpensive. The 3-monthly method is considered more economical due to the longer administration interval, which is once every three months. The use of the 3-month injectable contraceptive is closely related to melasma because of long-term, high-dose progestin exposure that stimulates melanogenesis through the MSH-melanocyte-tyrosinase pathway, where progestin modulates the expression of steroid receptors in melanocytes, thereby increasing the activity of tyrosinase as the main enzyme of melanogenesis, which leads to persistent diffuse hyperpigmentation, especially when exacerbated by ultraviolet radiation exposure and the added influence of

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age, environmental factors, and other factors that make hyperpigmentation more likely to occur and be persistent.[15]

Based on research results from 67 respondents, the most common cases of melasma were mild, with 28 cases (41.8%) occurring in women aged 30-50 years old at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Previous research conducted by Muslimah (2023) on the incidence rate of melasma due to the use of hormonal contraceptives at the Tlogosari Kulon Community Health Center obtained research results that 64.1% of respondents experienced melasma and research conducted by Jannah (2018) on the relationship between the incidence of melasma and the use of hormonal contraceptive injections and combination pills at BPM Dwi Astutik, Petungsewu Village, Dau, Malang Regency obtained research results 50% of patients experienced melasma.[9,20]

Several factors can cause melasma, including sun exposure, genetics, and hormonal factors. Estrogen and progesterone are the hormones responsible for melasma. Estrogen increases the activity of the enzyme tyrosinase and the expression of the proteins TRP1 and TRP2, which play a role in melanin synthesis. Progesterone, on the other hand, triggers melanocyte proliferation and tyrosinase activity. Melasma generally occurs in adults aged 30-55 years old and is more common in women. Melasma is more common in women because women have higher levels of the hormones progesterone and estrogen.

Melasma is more likely to occur in mild degrees in injectable contraceptive users because injectable contraceptives, both monthly combination and three-monthly progestin-only contraceptives, produce a more stable hormonal profile than oral contraceptives or implants, which fluctuate daily. This results in constant but moderate stimulation of melanogenesis, which generally results in mild melasma. Furthermore, administration at 1–3-month intervals causes hormone levels to gradually decrease before the next dose, resulting in relatively lower cumulative exposure to melanocytes, and less hyperpigmentation. In injectable users, in the absence of additional triggering factors, melasma may occur, such as UV exposure, pregnancy, genetics, use of anticonvulsant and photosensitizing medications, hormonal or thyroid disorders, and use of bleaching creams. If these factors are ruled out, it is more often limited to a mild degree.[14,22]

Based on the research results from 67 respondents, the longest duration of use was 1-3 years and >3 years, namely 32 people (47.8%) in women aged 30-50 years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Previous research conducted by Raihana (2023) on the Relationship between the Length of Use of 3-Month Injectable Contraceptives and the Incidence of Vaginal Discharge in Couples of Childbearing Age in the Kuranji Community Health Center Work Area, Padang City, obtained research results that the longest duration of use of injectable contraception was >6 months, namely 60.7%[24] and also research conducted by Rahmawaty (2024) on the Effect of Type of Injectable Contraceptive and Duration of Use on Weight Gain in Mothers of Childbearing Age at the X Bugel Midwife Clinic, Kedung Jepara,

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obtained research results that the longest duration of use was 1-6 years (50.3%).[21]

The duration of use of injectable contraception in KB acceptors is used because injectable contraception has an average success rate of over 99%, is practical, effective and safe, the duration of use of injectable contraception of more than 1 year is chosen by acceptors because they are not longer to have children and are afraid of using long-term contraception because long-term use can cause difficulty in returning to fertility. In addition, the duration of use of injectable contraception of more than one year has advantages for women because it can cause amenorrhea, so women do not feel bothered by the arrival of menstruation.[21]

The association between the duration of injectable contraceptive use and the incidence of melasma is based on the fact that the longer the injectable contraceptive is used, the greater the cumulative exposure to progestin or estrogen-progestin combination, which stimulates the release of melanocyte-stimulating hormone (MSH) and increases the expression of steroid receptors in melanocytes, thus increasing the activity of tyrosinase, the main enzyme in melanogenesis. In the initial phase, hyperpigmentation can be mild and reversible, but chronic hormonal exposure triggers melanin accumulation in the dermis and weakens pigmentation regulatory mechanisms, making melasma more likely to become persistent or recurrent. This condition is exacerbated by age, where in women aged 30–50 years, epidermal regeneration decreases, making pigment deposits difficult to eliminate and hyperpigmentation lesions appear more persistent.[14,22]

Based on the research results, the most melasma cases occurred in the use of progestin injections (3 months), namely 38 people (82.6%) compared to combination injections (1 month), namely 11 people (52.4%). The results of statistical tests using the chi-square test obtained p value = 0.022 (p <0.05), which means there is a relationship between the use of injectable hormonal contraception and the incidence of melasma in women aged 30-50 years at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

Previous research conducted by Muslimah (2023) on the incidence of melasma due to the use of hormonal contraceptives at the Tlogosari Kulon Community Health Center obtained research results that there was a relationship between the type of contraception and the incidence of melasma as indicated by p value of 0.007 and also research conducted by Gita (2022) on the Relationship between the Use of Injectable Hormonal Contraceptives and the Incidence of Melasma in the Independent Practice of Midwife Luh Ayu Koriawati obtained research results that hormonal contraception was proven to be significantly related to the incidence of melasma. (p = 0.000).[5,9]

The use of a 3-monthly injectable hormonal contraceptive carries a greater risk of melasma than the use of a 1-monthly injectable. This may occur due, in part, to the estrogen and progesterone content of the injectable, which is used for longer periods. A 1-monthly injectable typically contains a combination of estrogen and progestin, or progesterone, while a 3-monthly injectable contains only the progestin hormone depot medroxyprogesterone acetate (DMPA). Estrogen contributes to pigmentation disorders by increasing the expression of tyrosinase, TRP-1, and TRP-2 mRNA, as well as tyrosinase activity in

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melanocytes. Progesterone functions to stimulate melanocyte proliferation and tyrosinase activity.[14]

The estrogen contained in the monthly injectable contraceptive can trigger hyperpigmentation, but the effects are relatively milder because the levels are more balanced and the hormone's duration of action is shorter. Whereas the 3-monthly injectable, which only contains progestin but in large doses, can increase the activity of melanocyte stimulating hormone (MSH), which stimulates melanocyte cells to produce more melanin and trigger melasma. Also, the duration of action of the hormone in the 1-month injectable is shorter, so if side effects such as melasma occur, they can disappear more quickly if stopped. Compared to the 3-monthly injectable, which has long-term effects because hormone levels remain in the body longer, so the risk of pigmentation changes is also greater.[25]

Accumulated use of 3-month injections tend to be longer due to its perceived practicality (only 4 injections per year). Continuous, long-term exposure to progestin increases the likelihood of melasma, particularly in the first 6 months to 2 years of use. The prevalence of melasma declines after 24 months of use, suggesting a multifactorial etiology involving hormonal interactions, genetic predisposition, and environmental factors.[20]

The results of the study showed a tendency that the longer use of injectable contraception and the long-term effects of hormone levels that persist longer in the body, the risk of melasma also increases.[9] Thus, choosing to use injectable contraception such as the 3-monthly injection, even though it only contains progestin and is more practical because it only contains injections every 12 weeks, but the hormone levels that persist in the body have long-term effects on the occurrence of melasma, where the long term using, the higher the possibility of skin hyperpigmentation. Therefore, health workers are expected to be able to provide comprehensive information regarding the long-term side effects of injectable contraception use, so that acceptors can be more alert and take preventive measures, for example by protecting themselves from sun exposure and monitoring their skin health regularly.

The results of the study also showed that 10 people (47.6%) who used the 1-monthly injectable contraceptive did not experience melasma, and 8 people (17.4%) who used the 3-monthly injectable did not experience melasma. This shows that melasma can indeed be caused by the use of hormonal contraceptives such as birth control injections, but other factors such as hormone dose, age, individual sensitivity to hormones, and sun exposure also influence the occurrence of melasma. Susceptibility to melasma is also influenced by genetic factors and skin type, where individuals with Fitzpatrick phototype I–II or lighter skin types have lower melanocyte activity so that exposure to exogenous hormones (progestin and combination) from injectable contraceptives does not always cause hyperpigmentation.[24,26]

Furthermore, variations in steroid receptor expression in melanocytes result in varying sensitivity to hormonal stimulation, resulting in a significant increase in melanogenesis in some women. Duration of use also plays a role, as short-term use results in cumulative hormonal exposure that is insufficient to trigger melasma manifestations.[26]

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CONCLUSION

Based on this study, it can be concluded that there is a relationship between the use of injectable hormonal contraceptives and the incidence of melasma in women aged 30-50 years old at the Surantiah Pesisir Selatan Community Health Center in 2024-2025.

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