

The Effect of Progestin Injection Contraception on Changes in Amount of Fat and Muscle in Female Patients at Slamet Riyadi Hospital, Surakarta

Sri Sukamti ¹⁾ Aris Prastyoningsih ²⁾ Christiani Bumi Pangesti ³⁾

¹⁾*Kusuma Husada University of Surakarta*

sukamti855@gmail.com

ABSTRACT

This study aims to determine the effect of Progestin Injection Contraception on changes in the amount of fat and muscle in female patients at Slamet Riyadi Hospital, Surakarta. The research method used a quantitative research design with a Quasi-Experimental approach and a one-group pretest-posttest design. The population in this study was women who used progestin injection contraception as a method of contraception in the last three months, totaling 20 acceptors. Meanwhile, the sample of this study was 14 people. This research was conducted at Slamet Riyadi Hospital, Surakarta, over three months. Data analysis consisted of two stages: univariate analysis and bivariate analysis. The results showed that there was an effect of Progestin Injection Contraception administration on changes in fat and muscle levels before and after, with P values of 0.006 and 0.027, respectively. Therefore, these findings underscore the importance of monitoring body composition for Progestin Injection Contraception users and the need for further studies to understand the long-term impact of this type of contraception.

muscle

Keywords:

Progestin Injection Contraception, Fat, Muscle

1. INTRODUCTION

Indonesia in the context of population and demographics is one of the countries that stands out with a significant population. Indonesia is ranked fourth in the world with the most populous countries after China (1.42 billion people), India (1.37 billion people) and the United States (328 million people) (Priyanti, S., & Syalfina, 2017). Based on the 2019 World Population Data Sheet, Indonesia currently has a population of 269 million people or 3.49% of the total world population. Apart from that, the province of Central Java also has an important contribution to Indonesia's population, with a population reaching 36.52 million people. In particular, the city of Surakarta, as one of the cities in Central Java, has a significant population, reaching 522,364 people (Sartika et al., 2021).

One of the factors causing an increase in population is fertility or birth rate. According to the results of research, births have a positive influence on the rate of population growth (Ainy et al., 2019). The increasing number of births will result in a higher population growth rate (Mahendra, 2019). Progestin injection contraception is an effective and popular hormonal contraceptive method among women. Progestin Injection Contraception involves periodically administering progestin to prevent pregnancy by inhibiting ovulation and changing cervical mucus (Priyanti, S., & Syalfina, 2017). Progestin contraceptives come in various dosage forms, ranging from injection, implant, to oral. The most popular type of injectable contraception is the three-month hormonal injectable contraceptive compared to the one-month injectable contraceptive, which is 90%. Progestin Injection Contraception is a progestin injection contraceptive that is very effective, safe, and can be used by all women of reproductive age (Mosahab et al., 2021).

In the context of dealing with the increasing number of births and controlling the rate of population growth, the Indonesian government has implemented various methods. One way that has been done is through the Family Planning program which was launched in 1968. This program aims to provide services and information regarding contraception to the community, so that they can make conscious and responsible decisions regarding family planning. This family planning program has an important role in providing contraceptive services (Zahroh & Isfandiari, 2015).

Although three-month injectable hormonal contraception is widely used because it has been proven effective in preventing pregnancy, there is still no clear understanding of its effect on changes in the amount of fat and muscle in a woman's body. Previous research has produced varying findings, so a deeper understanding is needed regarding the impact of %. Progestin Injection Contraception on body composition, related to the hormone progesterone in Depo medroxyprogesterone acetate which can stimulate the appetite control center in the hypothalamus and increase appetite (Black et al., 2015).

Preliminary study at Slamet Riyadi Hospital in June 2023 and the results are Data on birth control acceptors: Injections: 12 people, IUDs: 8 people, Implants: 0, MOW : 3 people and MOP : 1 person. Of the 12 injection acceptors interviewed, it was found that 75% of them complained of weight gain. This is in accordance with the opinion who states that the hormone progesterone makes it easier to convert carbohydrates and sugar into fat (Moloku et al., 2016). As a result, fat tends to collect under the skin and is not caused by retention (accumulation) of body fluids. Apart from that, Medroxyprogesterone acetate is also known to stimulate the appetite control center in the hypothalamus, which can result in acceptors eating more than usual. This in turn can cause weight gain and fat accumulation, especially in individuals who tend to experience excess fat (hyperlipidemia). Based on this background, researchers were inspired to conduct research entitled the effect of Progestin Injection Contraception on changes in the amount of fat and muscle in female patients at Slamet Riyadi Hospital, Surakarta.

2. METHOD

The research method uses a quantitative research design with a Quasi Experimental approach with a one group pretest posttest design. Meanwhile, the sample for this study was 14 people women of childbearing age who use progestin injectable contraception at Salmat Riyadi Hospital. This research was conducted at Slamet Riyadi Hospital, Surakarta, for three months, from August to October. Data analysis consisted of two stages, namely univariate analysis to determine the characteristics of respondents including age, education and occupation, while bivariate analysis consisted of normality, homogeneity and paired sample t tests. This research has gone through the Research Ethics Commission of Kusuma Husada University Surakarta with number EC 1666/UKH.L.02/EC/X/2023.

3. RESULTS

3.1. Respondent's Characteristics

1) Respondent's age

The frequency distribution based on maternal age group can be seen in table 1 below.

Table 1. Frequency Distribution of Respondents' Age

Age	F	%
< 20	0	0
20-30	8	57,1%
31-44	6	42,9%

n = 14 primary data source (2023)

Based on the age distribution table for 14 respondents who use progestin injection contraception, it can be seen that the majority are in the 20-33 year age group, with 57.1% or 8 people from the total respondents.

The 31-44 year age group was followed by 57.1% or 6 respondents. This table provides an overview of the age distribution of respondents involved in the study, showing that progestin injectable contraceptives are used across a wide range of adult ages.

2) Education

The frequency distribution based on maternal education can be seen in table 2 below.

Table 2. Respondents' educational history

Education	F	%
Junior secondary education	1	7,1
Majority secondary education	5	35,7
Diploma 3	3	21,4
Diploma 4	1	7,1
bachelor's degree	3	21,4
Master's degree	1	7,1

n = 14 primary data source (2023)

Table 2 shows the distribution of education levels of 14 respondents who use progestin injection contraception. Of them, one respondent (7.1%) completed junior secondary education. The majority, namely 35.7%, were high school graduates, indicating that upper secondary education level had the largest portion among respondents.

Furthermore, 21.4% of respondents had an education diploma (D3), and the same number also held a bachelor's degree. In addition, 7.1% had a Master's degree.

3) Employment

Frequency distribution based on work can be seen below in table 3

Table 3. Respondent's Employment History

Employment History	F	%
Non	3	21,4
House wife	2	14,3
Swasta worker	5	35,7
Government employees	3	21,4
Self-employed.	1	7.1

n = 14 primary data source (2023)

Table 3 shows the job variations of the 14 respondents in the progestin injection contraception study. Three respondents (21.4%) were categorized as not working. Household work was 14.3%. Private workers were the largest group, with 5 respondents or 35.7%. Government employees, were represented by 3 respondents, who also made up 21.4% of the total. Finally, one respondent (7.1%) was self-employed.

3.2. Changes in Fat and Muscle Before and After Treatment

1) Changes in Fat

Table 4. Changes in fat before and after progestin injection contraception

Changes of fat	n	%
Increase	7	50 %
Decreaste	2	14,3%
Constant	5	35,2%

Based on the table above, it can be seen that there were changes in fat composition in respondents before and after receiving progestin injection contraception. Of the 14 respondents sampled, the majority experienced an increase in fat, namely 7 people with a percentage of 50%. Meanwhile, only 2 people (14.3%) experienced a decrease in fat, and 5 other people (35.2%) experienced no change in their fat composition.

2) Changes in Muscle

Table 5. Changes in muscle before and after progestin injection contraception

Changes of muscle	n	%
Increase	8	57,14%
Descrease	4	28,6%
Constant	2	14,3%

Meanwhile, for muscle changes, of the 14 respondents involved in this study, the majority, namely 8 people or 57.14%, experienced an increase in muscle mass. Meanwhile, 4 respondents

or 18.6% experienced a decrease in muscle mass, and 2 people or 14.3% did not experience any change in their muscle mass.

3.3. The Effect of progestin injection contraception on Fat and Muscle Changes

1) The effect on fat

Table 6. Relationship between progestin injection contraceptive use and fat mass

Pair 1	Mean	Std. Deviation	Std. Error Mean	t	df	P value
Fat before KIP - Fat after KIP	-1.500	1.698	.454	-3.305	13	0.006

Based on the results of the paired sample test, it can be seen that the significance value is 0.006, which is much smaller than the threshold of 0.05. The calculated t value is -3.305, which in absolute value ($|t \text{ calculated}| = 3.305$) is greater than the t table value ($t \text{ table} = 2.160$) for degrees of freedom (df) of 13. This shows that there is a statistically significant influence from progestin injection contraceptive injection on changes in fat levels, with the indicated change being a decrease, which is indicated by a negative sign in the average difference. Therefore, the alternative hypothesis (H1) which states that there is a significant difference in fat levels before and after giving progestin injection contraceptive injections is accepted, provided that the effect shown is negative, indicating a decrease in fat levels.

2) The effect on muscle

Pair 2	Mean	Std. Deviation	Std. Error Mean	t	df	P value
Muscle before KIP - Muscle after KIP	-1.429	2.138	.571	-2.500	13	0.027

The results of the paired sample test on muscle levels show that the significance value is 0.027, which is smaller than 0.05. The calculated t value is -2,500, the absolute value ($t \text{ calculated} = 2,500$) is greater than the t table value ($t \text{ table} = 2,160$) for degrees of freedom (df) of 13. This shows that there is a statistically significant effect of progestin injection contraceptive on changes in muscle levels, with the change indicated being a decrease, which is indicated by a negative sign in the average difference. Therefore, the alternative hypothesis (H1) states that there is a significant difference in muscle levels before and after injection KIP is accepted, provided that the effect shown is negative, indicates a decrease in muscle tone.

4. DISCUSSION

a. Respondent's Age

The age distribution of respondents in this study shows that the majority of progestin injection contraceptive users are in the 20-30 year age group. This finding is in line with research, who show that hormonal contraceptive use tends to be more common among older women, often due to relationship stability or more solid decisions regarding family planning. The fact that 57.1% of respondents were in this age group confirms that progestin injection contraception is a popular choice among adults (Lm et al.,

2016). Meanwhile, 42.9% of respondents aged 31-44 years demonstrated that progestin injection contraception is also relevant for mature women. This indicates awareness and active use of hormonal contraceptive methods in early adulthood. Who found that increased access to sexual information and education has encouraged effective contraceptive use among this population (Chowanski et al., 2017).

Age groups under 20 years were not found in the study, reflecting the legal age limit for medical consent without parental consent or a lack of knowledge or access to hormonal contraception among adolescents. This strengthens the findings of who highlighted barriers to access and education as key factors influencing contraceptive use among adolescents. The age distribution observed in this study suggests different progestin injection contraceptive preferences and effectiveness among different age groups. This understanding is important for health practitioners in developing educational strategies and contraceptive services tailored to specific needs based on age (Oura, 2021).

b. Educational background

The education level of respondents in this study offers significant insight into contraceptive access and choice. With 35.7% of respondents who are high school graduates, these data suggest that individuals with upper secondary education are more exposed to adequate reproductive health information, enabling them to make more informed decisions about contraception. This supports research conducted which found a relationship between a higher level of education and choosing a more effective and consistent contraceptive method (Bradbury et al., 2017).

The junior high school education level, represented by 7.1% of respondents, is often the transition point where adolescents begin to receive formal education on reproductive health. According to Brown and Tierney (2020), the introduction of sexual education at this level can play a key role in the formation of contraceptive attitudes and behavior. The presence of respondents with diploma (D3) and bachelor's degrees (S1), each at 21.4%, indicates that individuals with higher education also choose progestin injection contraception. Literature shows that those with higher education tend to have higher health awareness and are more proactive in managing their reproductive health (Mahendra, 2019).

Meanwhile, one respondent (7.1%) had the highest education, namely Master's degree, indicating that progestin injection contraception remains an option. Research by Lee et al. (2017) emphasize the importance of inclusive public health strategies that ensure contraceptive information and services are accessible to all levels of society, regardless of educational background. This distribution of educational levels highlights the importance of education as a factor in the choice of contraceptive method. Health care providers and policymakers need to take educational background into account when designing and implementing reproductive health programs, by adapting communication and education approaches to cover all literacy levels (Mosahab et al., 2021).

c. Employment history

The employment history of respondents in this study reflects the economic and social diversity that influences the use of progestin injection contraception. With 14.3% of respondents being working housewives, these findings highlight progestin injection contraception as the preferred method by this group, which prioritizes long-acting contraceptive methods with minimal side effects that do not require daily monitoring. This research is supported who found that the convenience and long-term effectiveness of injectable contraceptives make them attractive to domestic workers who have many daily responsibilities (Oura, 2021).

Private sector workers, who accounted for 35.7% of respondents, chose progestin injectable contraceptives because of their consistency allowing them to manage their professional and personal lives without additional concerns about contraceptive failure. This is in line with findings, who stated that contraceptive flexibility and reliability have an impact on method choice by working women (Pratiwi et al., 2014). Civil servants comprising 21.4% reflect greater job stability and access to health information, which in turn may facilitate access to injectable contraception and more appropriate choices based on more comprehensive knowledge. Research shows that public sector workers often have higher levels of health literacy, which influences their health decisions (Sartika et al., 2021).

The presence of self-employed respondents suggests that progestin injection contraception is also accepted among entrepreneurs, who value greater control over family planning due to business demands. These findings are in line with a study, which highlights that self-employed people tend to make strategic contraceptive decisions to optimize the balance between work and family life (Sartika et al., 2021). Meanwhile, 21.4% of respondents were unemployed, which could include students, job seekers, or individuals who were unable to work. The availability of progestin-injectable contraception to this group signals broader accessibility and public health initiatives to ensure contraception is affordable for all levels of society, as described. This diversity of employment histories highlights the importance of considering occupational factors in providing relevant contraceptive information and services. Deep understanding of how work influences preferences and access Contraception can help in designing reproductive health programs more effective and inclusive (Chowanski et al., 2017).

d. The Effect of progestin injection contraceptive on Fat Changes

The findings of this study showed an increase in fat levels in 7 of the 14 respondents studied, with a significant proportion of 50% experiencing an increase after using progestin injection contraception. This provides additional insight into the growing discussion about the effects of hormonal contraception on body composition. This increase in fat mass is the impact of progestin on the regulation of lipid metabolism. This finding is in line with research, who demonstrated that progestins can influence lipid homeostasis and play a role in the lipolysis process. The study conducted also stated that contraceptives containing progestin can change lipogenic signals in adipose tissue. These changes have the potential to influence the distribution of fat in the body, indicating the influence of progestin in the processes of lipogenesis and lipolysis. However, it should be noted that increased fat levels are not always directly related to the use of progestin injection contraception. Other variables such as diet, physical activity, and genetic factors also play a role in determining body fat composition. Research also emphasized the importance of considering lifestyle which can influence the impact of hormonal contraception on fat composition (Black et al., 2015).

e. The Effect of progestin injection contraception on Muscle Changes

This study found that 8 people from all respondents or 57.14% experienced an increase in muscle mass after using progestin injection contraception. The increase in muscle mass in progestin injection contraceptive users can be understood through the lens of the hormonal effects of progestin. progestins contribute to increased muscle mass by facilitating protein synthesis, which is an essential building block for muscle growth. This is because progestins have the ability to imitate or increase the activity of other hormones that support muscle anabolism, such as growth hormone (Lm et al., 2016).

Hormonal contraceptives such as progestin injection contraceptive can change biochemical signals that affect muscles. For example, the progestin in progestin injection contraceptive can modulate the androgen receptor, which has an important role in maintaining and strengthening muscle mass, although this effect may vary depending on the type of progestin used and the individual's sensitivity to the hormone. However, on the other hand, there is evidence that progestin injection contraceptive can also contribute to a decrease in muscle mass. This occurs when progestin triggers a catabolic response that results in muscle protein degradation faster than its synthesis. This can be caused by changes in hormonal regulation that affect muscle metabolism, such as increased levels of cortisol, which is known for its catabolic effects on muscle tissue (Lm et al., 2016).

The increase in muscle mass in progestin injection contraceptive users identified in this study reflects the potential of progestins to modulate muscle metabolism. Progestins have a supportive effect on muscle protein synthesis, which could play an important role in the observed increase in muscle mass. This effect can be explained by the ability of progestins to act on hormonal pathways that support muscle anabolism, providing the basis for more efficient muscle growth and muscle mass building (Faradita, 2017).

On the other hand, the decrease in muscle mass that occurred in a small proportion of subjects may indicate that progestin injection contraceptive triggers catabolic mechanisms under certain conditions (Mukhtar et al., 2021). This catabolic effect involves faster degradation of muscle proteins, potentially offsetting the process of protein synthesis. Thus, this study highlights progestin as a factor that influences muscle mass dynamics in progestin injection contraceptive users. Although the exact effects of progestins on muscle tissue still require deeper exploration, these findings make an important contribution to our understanding of how hormonal contraceptives may affect muscle composition (Agustina Nona, 2021).

5. CONCLUSION

Based on the results of research that has been conducted, it shows significant changes in the composition of fat and muscle in women. The majority of respondents were 20-30 years old, high school graduates, and worked as private workers. This research shows that half of progestin injection contraceptive users experienced an increase in fat levels, while more than half experienced an increase in muscle levels. Statistical analysis confirmed that these changes were significant, with relevant P values for changes in both fat and muscle. These findings encourage the importance of monitoring body composition for progestin injection contraceptive users and the need for further studies to understand the long-term impacts of using this type of contraception. Suggestions for health practitioners include considering the effects of IOP on body composition when providing contraceptive recommendations and providing appropriate education and counseling to patients.

ACKNOWLEDGEMENTS

Author acknowledgments to everyone who helped carry out the research leading to the publication of this article, all respondents as well as Slamet Riyadi Hospital as the research location.

REFERENCES

- Agustina Nona, S. (2021). The Relationship Between The Use of Depo Medroxyprogesterone Acetate Contraceptives with Weight Gain in Independent Practice Midwives in Pontianak City. *Journal of Public Health*, 4(2), 118–123.
- Ainy, H., Nurrochmah, S., & Katmawanti, S. (2019). Indikator fertilitas, seperti Crude Birth Rate (CBR), Total F. *Preventia : The Indonesian Journal of Public Health*, 4(1), 15.
- Black, A., Guilbert, E., Costescu, D., Dunn, S., Fisher, W., Kives, S., Mirosh, M., Norman, W. V, Pymar, H., Reid, R., Roy, G., Varto, H., Waddington, A., Wagner, M.-S., Whelan, A. M., Ferguson, C., Fortin, C., Kielly, M., Mansouri, S., & Todd, N. (2015). Canadian Contraception Consensus (Part 1 of 4). *Journal of Obstetrics and Gynaecology Canada : JOGC = Journal d'obstetrique et Gynecologie Du Canada : JOGC*, 37(10), 936–942. [https://doi.org/10.1016/s1701-2163\(16\)30033-0](https://doi.org/10.1016/s1701-2163(16)30033-0)
- Bradbury, K. E., Guo, W., Cairns, B. J., Armstrong, M. E. G., & Key, T. J. (2017). Association between physical activity and body fat percentage, with adjustment for BMI: A large cross-sectional analysis of UK Biobank. *BMJ Open*, 7(3), 1–9. <https://doi.org/10.1136/bmjopen-2016-011843>
- Chowanski, S., Lubawy, J., Paluch-Lubawa, E., Spochacz, M., Rosinski, G., & Słocinska, M. (2017). The physiological role of fat body and muscle tissues in response to cold stress in the tropical cockroach *Gromphadorhina coquereliana*. *PLoS ONE*, 12(3), 1–18. <https://doi.org/10.1371/journal.pone.0173100>
- Faradita, W. (2017). Hubungan Pengetahuan Ibu tentang Metode Kontrasepsi Suntik 3 Bulan dengan Kenaikan berat Badan di Klinik Cahaya Medan Tahun 2017. *Journal If Health, Education and Literacy*, 3, 1–7.
- Lm, L., Ramesh, S., Chen, M., Edelman, A., Otterness, C., Trussell, J., & Fm, H. (2016). *Progestin-only contraceptives : e cts on weight (Review)*. <https://doi.org/10.1002/14651858.CD008815.pub4.www.cochranelibrary.com>
- Mahendra, A. (2019). Analisis Faktor-Faktor Yang Mempengaruhi Fertilitas Di Indonesia. *Jurnal Riset Akuntansi & Keuangan*, 3(2), 223–242. <https://doi.org/10.54367/jrak.v3i2.448>
- Moloku, M., Hutagaol, E., & Gresty, H. (2016). Hubungan Lama Pemakaian Lama Kontrasepsi Suntik 3 Bulan Dengan Perubahan Berat Badan. *Ejournal Keperawatan (e-Kp) Volume 4 Nomor 1*, 4, 1–8.
- Mosahab, R., Mahamad, O., Ramayah, T., RA Nur Amalina, Ekonomi, F., Diponegoro, U., Citraluki, J., Studi, P., Fakultas, A., Dan, E., Surakarta, U. M., Efendi, P., Mandala, K., عبدالله،ماهر، Fayzollahi, S., Shirmohammadi, A., Latifian, B., 崔宇红, 楚恒亚, ... Akuntansi, J. R. (2021). Karakteristik dan lama penggunaan kontrasepsi Depo medroxyasetat (dmpa) dengan kualitas hidup akseptor characteristics. *Media Kesehatan Politeknik Kesehatan Makassar*, 4(3), 410–419.
- Mukhtar, M., Rizani, A., & Setiawati, E. (2021). Hubungan Kontrasepsi Suntik Depo Medroxy Progesteron Asetat (DMPA) Dengan Pertambahan Berat Badan Di Wilayah Kerja Puskesmas Kertak Hanyar Kabupaten Banjar Tahun 2017. *Jurnal Skala Kesehatan*, 12(1), 42–53. <https://doi.org/10.31964/jsk.v12i1.297>
- Oura, P. (2021). Sociodemographic Indicators of Birth Rate in a Low Fertility Country—A Nationwide Study of 310 Finnish Municipalities Covering > 5,000,000 Inhabitants. *Frontiers in Public Health*, 9(April), 1–7. <https://doi.org/10.3389/fpubh.2021.643561>
- Pratiwi, D., Syahredi, S., & Erkadius, E. (2014). Hubungan Antara Penggunaan Kontrasepsi Hormonal Suntik DMPA dengan Peningkatan Berat Badan di Puskesmas Lapai Kota Padang. *Jurnal Kesehatan Andalas*, 3(3), 365–369. <https://doi.org/10.25077/jka.v3i3.130>
- Priyanti, S., & Syalfina, A. D. (2017). *Buku Ajar Kesehatan Reproduksi Dan Keluarga Berencana*. www.kekatapublisher.com. December 2016.
- Sartika, W., Qomariah, S., & Herlina, S. (2021). Peningkatan Berat Badan dengan Penggunaan Kontrasepsi KB Suntik 1 Bulan. *Jurnal SMART Kebidanan*, 8(1), 34. <https://doi.org/10.34310/sjkb.v8i1.444>
- Zahroh, A. H., & Isfandiari, M. A. (2015). Indeks Masa Tubuh Pada Akseptor Kontrasepsi Hormonal. *Jurnal Berkala Epidemiologi*, 2019(vol 3 no 2 Mei 2015), 170–180.