JPPIPA 10(12) (2024)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Comparison of the Effects of Injectable and Implant Progestin Contraceptive Agents on Weight Increase Based on Body Mass Index (BMI) in Family Planning Acceptors in District

Sukarni Setya Yuningsih[1*], Atika Juliarni[1], Desti Indayani[1], Mega Yanti Erdha[1], Milda Anggraini[1], Nur Afni[1]

[1] Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Jakarta, Indonesia.

Received: August 27, 2024
Revised: October 08, 2024
Accepted: December 25, 2024
Published: December 31, 2024

Corresponding Author:
Sukarni Setya Yuningsih
karnisetya9@gmail.com

DOI: 10.29303/jppipa.v10i12.8974

Abstract: Weight gain is one of the side effects that birth control acceptors often worry about, especially users of hormonal methods such as progestin injections and implants. This concern is reasonable because several studies show that the use of hormonal contraception can increase the risk of weight gain. This study aims to compare the use of progestin injections and implants on weight gain based on Body Mass Index (BMI) in family planning acceptors in Muara Enim Regency in 2024. The research sample consists of 266 respondents who are acceptors of birth control injections and implants, with an observational analytical research design using a case control design. The sample size was determined using the G-Power Software application Version 3.1.6 with correlation and regression tests. The results of the analysis show that family planning acceptors with progestin injectable contraceptives have a 1.68 times greater chance of experiencing abnormal weight gain (obesity) compared to family planning acceptors who use implants (95% CI 1.021-2.752). It is hoped that the results of this research can be used as a reference for midwives to provide education regarding the negative impact of weight gain on family planning acceptors, so that they can inform more appropriate hormonal contraceptive choices.

Keywords: Birth Control Septor; BMI; Implants; Progestin Injection; Weight

Introduction

State Preparing for pregnancy should consider health risks and benefits along with other circumstances such as age, fertility, access to health services, childcare support, social and economic circumstances, and personal preferences in making choices for the timing of the next pregnancy. This is important to avoid complications that may occur during pregnancy. Apart from that, the distance between births needs to be regulated for the health and welfare of both mother and baby (Ministry of Health of the Republic of Indonesia, 2021). In Indonesia, progestin injections and implants are the two most widely used hormonal contraceptive methods. Based on 2021 SDKI data, the proportion using progestin injections reached 42.4% and implants reached 6.2% (SDKI, 2021). Depo Medroxy Progesterone Acetate (DMPA) contraception and levonogestrel implant contraception are associated with weight gain in some acceptors. DMPA is a form of hormonal contraception that is given by injection every three months. DMPA contains synthetic progesterone which is similar to natural progesterone. Although progesterone usually has glucocorticoid properties, the glucocorticoid effects of DMPA are generally not significant at the contraceptive doses used (Patmahwati, 2019).

The levonogestrel implant is a contraceptive method in the form of a small implant that is implanted under the skin. Levonogestrel is a derivative of the testosterone hormone, however, levonogestrel implants

How to Cite:
Yuningsih, S. S., Juliarni, A., Indayani, D., Erdha, M. Y., Anggraini, M., & Afni, N. (2024). Comparison of the Effects of Injectable and Implant Progestin Contraceptive Agents on Weight Increase Based on Body Mass Index (BMI) in Family Planning Acceptors in District. *Jurnal Penelitian Pendidikan IPA*, *10*(12), 10226–10230. https://doi.org/10.29303/jppipa.v10i12.8974

do not have a direct effect as a mineralocorticoid. Side effects of levonogestrel implants are changes in body weight, and some acceptors may experience weight gain (Patmahwati, 2019). Weight gain is one of the side effects most worried about by birth control acceptors, especially users of hormonal methods. This concern is reasonable, because several studies show that the use of hormonal contraception can increase the risk of weight gain (Nurmainah et al., 2020). Long-term use of Depo Progestin affects body weight and the hormone leptin, also resulting in estrogen levels at their lowest levels. Increased body weight is a manifestation of an increase in the number and enlargement of adipose cells (fat cells), due to decreased levels of the hormone estrogen. Fat cells (adipose cells) produce the hormone leptin which has an important role in signaling that regulates energy homeostasis both centrally and peripherally, reducing appetite, adipose tissue mass and body weight. Physiologically, the hormone leptin regulates body weight by working on the hypothalamus with the effect of reducing appetite (Wahyuni, 2016)

Research by Yusran et al. (2022) shows that the results of the analysis between the length of use of hormonal contraceptives and the risk of obesity have a significant relationship with a value of P=0.000. The results of this study can be concluded that there is a relationship between the duration of hormonal contraceptive use and the risk of obesity. Research by Nelson et al. (2022), the results of a meta-analysis, obtained research results comparing the effects of progestin injections and implants on changes in body weight. The results showed that birth control acceptors who used implants experienced an average weight gain of 2.1 kg during the first year of use, compared to 0.8 kg for users of progestin injections. This difference, although small, is statistically significant. An initial survey conducted on 10 hormonal contraceptive users found that there was a variation in weight gain. Researchers observing weight gain before and after over a period of more than 1 year of use found that 5 people who used 3-month injections (progestin injections) experienced weight gain of 1-1.5 kg every month, while 5 people who used contraceptive implants found that 2 people (40%) experienced no weight gain, and 3 people (60%) experienced weight gain in more than 1 year, an increase of around 3-5 kg.

Reviewing the results of the BMI formula for injectable and implant contraceptive acceptors with a duration of use of 1 year, it was found that the majority of progestin hormonal contraceptive acceptors were overweight when using injectables compared to implants. Although the use of progestin hormonal birth control has the side effect of increasing body weight. Based on variations in weight gain, researchers are interested in assessing weight gain based on the BMI formula to determine weight categories, namely thin, normal, overweight and obese using progestin hormonal contraception, namely progestin injections and implants, so the title of the current research is "Comparison of Use Progestin Injections and Implants on Weight Gain in Family Planning Acceptors in Muara Harapan Village, X Regency.

Method

This research is a type of analytical research observational plan case control with approach quantitative. The participants in this study were menopausal women in district. Convenience sampling (also known as Haphazard Sampling or Accidental Sampling) is the type nonprobability or nonrandom sampling in which members of a target population who meet certain practical criteria, such as ease of accessibility, geographic proximity, availability at a particular time, or willingness to participate are included for research purposes. The sample size is determined using a software application G-Power Version 3.1.9.4 with correlation and regression test), type of power correlation P H1 is 0.2, α err prob = 0.05, power (1-β err prob) = 0.95 Estimated total sample to be recruited is 266 Respondents are family planning acceptors in district X. The research instrument is in accordance with the purpose of the research Data collection using body weight and height observation sheets using a height measuring device using a stadiometer and measuring body weight using a weight scale.

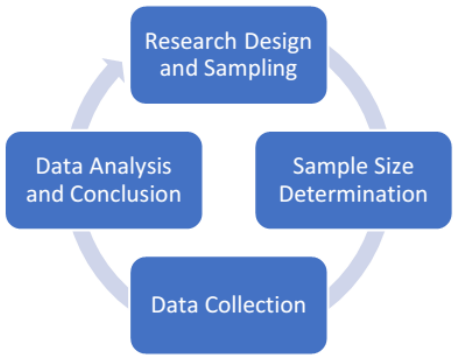

Figure 1. Stages of the research

Result and Discussion

Results

Characteristics of Respondent

Descriptive statistics test on the frequency of 266 respondents, the majority of whom used 3-month injectable contraceptives, 157 people (59.0%) and implant contraceptives, 109 people (41.0%). the majority of BMIs were obese, 154 (42.1%), normal BMIs, 112

(57.9%). In this study, no BMI was found to be underweight. In the group using injections, the majority experienced abnormal weight (fat) as many as 99 people (63.1%) and normal weight as many as 58 people (36.9%). In the group using implants, it was found that the majority had a normal weight, 54 people (49.5%) and an abnormal weight (fat) 55 people (50.5%).

Bivariate Test

Statistical test crosstab chy square using value risk is taken Results of analysis of the use of progestin injections and implants on weight gain based on BMI using Chi-square obtained a significance value amounted to 0.041, because p-value < a (p-value<0.05), it can be concluded that there is a relationship between the use of progestin injections and implants on weight gain based on body mass index (BMI) (Bistervels et al., 2019; Stempak-Droissart et al., 2022). The comparison was reviewed using the OR calculation results of 1.676, which means that birth control acceptors using progestin injectable contraception are 1.676 times more likely to experience abnormal weight gain (fat) compared to those using implant contraception (95% CI 1.021 -2.752)

Discussion

In this study, it was found that there was a relationship between the use of progestin injections and implants on weight gain. The comparison was reviewed using the OR calculation results of 1.676, which means that birth control acceptors using progestin injectable contraception are 1.676 times more likely to experience abnormal weight gain (fat) compared to those using implant contraception (95% CI 1.021 -2.752) This research is different from previous research by Phatmawati (2019) explaining that the average BMI of implants is higher than hormonal injections, with an average monthly weight gain of 2.3 – 2.9 kg with a BMI value of p=0.031. The theory of Matahari et al. (2019) explains that DMPA is a microcrystalline suspension of synthetic progestin that is injected intramuscularly (Andreoli et al., 2024; Bick et al., 2021). DMPA works by inhibiting ovulation by suppressing FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone) levels and eliminating the increase in LH. This results in a relative hypoestrogenic state by suppressing serum estradiol concentrations, which may provide therapy for endometriosis-related pain.

Research by Bonny et al. (2002) explains that DMPA acceptors who experience an increase in body weight of more than 5% of their initial body weight after 6 months of DMPA use have an increased risk of gaining excess weight in the future. The dose for 3-month injections or progestin injections, namely depo progestin, is available in the form of a liquid injection with a dose of 150 mg/ml. Meanwhile, the dose for contraceptive implants is that each contraceptive implant capsule contains 36 mg of levonorgestrel, which is released every day at 80 mg. Based on previous researchers' theories and opinions, it can be concluded that 3-month injectable contraception has a greater chance of causing weight gain and obesity compared to implant contraception (Franasiak et al., 2021; Mulvagh et al., 2022). This is caused by differences in the dose of progestin contained in each contraceptive method .In 3-month injectable contraception, users receive a larger dose of progestin compared to the implant. The 3-month injection contains depot medroxyprogesterone acetate (DMPA) at a higher dose, usually 150 mg, which is given intramuscularly every 3 months. Meanwhile, contraceptive implants contain levonorgestrel at a lower dose, usually 68-75 mg, which is released slowly over 3-5 years. This difference in progestin dosage has significant implications for the side effects that arise, especially weight gain (Chabbert-Buffet et al., 2019; Halpern et al., 2021; Lindley et al., 2021).

Progestin in higher doses, such as the 3-month injection, has more potential to cause increased appetite, slowed metabolism, and greater water retention. These things can trigger more dramatic weight gain and increase the risk of obesity in 3-month injectable contraceptive users. On the other hand, contraceptive implants with lower progestin doses tend to have less side effects of weight gain (Achilles et al., 2018; Cipriani et al., 2020; Rocca et al., 2021; Todd et al., 2024). Although there is still a possibility of weight gain, the risk is lower than with 3-month injections. Therefore, based on theory and previous research, it can be concluded that 3-month injectable contraception has a greater chance of causing weight gain and obesity compared to implant contraception, especially due to the difference in the dose of progestin contained in each method.

Conclusion

Weight gain is one of the side effects that birth control acceptors often worry about, particularly among users of hormonal methods such as progestin injections and implants. This concern is justified, as several studies indicate that the use of hormonal contraception can increase the risk of weight gain. The present study aims to compare the effects of progestin injections and implants on weight gain, specifically based on Body Mass Index (BMI), among family planning acceptors in Muara Enim Regency in 2024. The research involved a sample of 266 respondents who were acceptors of birth control injections and implants, utilizing an observational analytical research design with a case control approach. The sample size was calculated using the G-Power Software application Version 3.1.6,

employing correlation and regression tests to ensure the robustness of the findings. The results of the analysis revealed that family planning acceptors who used progestin injectable contraceptives had a 1.676 times greater likelihood of experiencing abnormal weight gain (obesity) compared to those who used implants (95% CI 1.021-2.752). This finding highlights the differential impact of various hormonal contraceptive methods on weight, underscoring the need for careful consideration when advising patients on their contraceptive options. It is hoped that the results of this research can be used as a valuable reference for midwives in their efforts to educate family planning acceptors about the potential negative impact of weight gain on their health. By informing acceptors about the lower risk of weight gain associated with implants compared to progestin injections, midwives can guide women towards making more informed decisions regarding their contraceptive choices. This is especially important in encouraging the use of long-term contraceptive methods (MKJP) like implants, which not only offer effective birth control but also pose fewer risks in terms of undesirable side effects such as weight gain. Ultimately, this research aims to support midwives in promoting healthier contraceptive options that align with the individual health needs and preferences of women, thereby enhancing the overall well-being of family planning acceptors.

Acknowledgments

We would like to express our deepest gratitude to our advisor who has guided us throughout the research process and to the respondents who have made significant contributions to the success of this study. Your support, guidance, and participation have been invaluable, and we greatly appreciate your effort and dedication. Thank you for your continuous encouragement and for making this research possible.

Author Contributions

The following statements should be used Conceptualization SSY, AJ, DI, MYE, MA, NA contributed to the data collection process, data processing, article writing.

Funding

This research was funded by personal funds.

Conflicts of Interest

The authors declare no conflict of interest.

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