Indonesian Journal of Global Health Research
Volume 8 Number 6, December 2026
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE EFFECT OF HORMONAL CONTRACEPTION ON CHANGES IN THE BODY MASS INDEX OF WOMEN OF REPRODUCTIVE AGE

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ABSTRACT
Hormonal contraception is widely used by women of reproductive age. Its use may be associated with changes in body weight, which may subsequently affect body mass index (BMI). This study aimed to analyze changes in BMI before and after at least six months of hormonal contraceptive use among women of reproductive age. This quantitative study employed a retrospective cohort study design. Secondary data were obtained from family planning registers and medical records at a Midwife Independent Practice (Tempat Praktik Mandiri Bidan, TPMB). The sample consisted of 44 women of reproductive age who used hormonal contraceptives, with data on their body weight and height recorded both before use and after at least six months of use; the sampling technique employed was purposive sampling. Data were collected via secondary sources from independent midwifery practices (TPMB) and met the following inclusion criteria: complete data, use of hormonal contraception in 2025, and a follow-up contraceptive check-up 6 months after insertion. The contraceptive methods included one-month and three-month injectable contraception. Data were analyzed using a paired t-test with a significance level of $\alpha = 0.05$. Most participants used one-month injectable contraception (63.6%), while 36.4% used three-month injectable contraception. Mean body weight increased from 61.27 ± 11.53 kg to 62.94 ± 10.97 kg, representing an increase of 1.67 kg. Mean BMI increased from 24.64 ± 4.33 kg/m² to 25.81 ± 4.12 kg/m², with a mean difference of 1.17 kg/m². The proportion of participants classified as overweight increased from 15.9% to 25.0%, while obesity increased from 27.3% to 29.5%. The paired t-test demonstrated a statistically significant difference in BMI before and after hormonal contraceptive use ($p = 0.009$). Significant changes in BMI were observed after at least six months of hormonal contraceptive use. Regular monitoring of body weight and BMI, along with counseling on healthy dietary patterns and physical activity, should be incorporated into contraceptive services.

Keywords: body mass index; hormonal contraception; women of reproductive age

How to cite (in APA style)
Sasanti, D. A., Hanum, E. A., & Secha, A. (2026). The Effect of Hormonal Contraception on Changes in the Body Mass Index of Women of Reproductive Age. *Indonesian Journal of Global Health Research*, *8*(6), 1371–1376. https://doi.org/10.37287/ijghr.v8i6.2896.

INTRODUCTION

According to the 2024 Population and Family Development Data and Information, modern contraceptive methods are predominantly hormonal, with injectable contraception being the most widely used method (35.6%), followed by oral contraceptive pills (7.5%), implants (6.9%), and intrauterine devices (IUDs) (6.1%). Hormonal contraceptive methods, including combined oral contraceptive pills, progestin-only injectables such as depot medroxyprogesterone acetate (DMPA), implants, and contraceptive patches, are widely used in family planning because of their effectiveness in preventing pregnancy. In several settings, including Indonesia, injectable contraception is reported to be one of the most commonly selected contraceptive methods. Consequently, potential adverse effects associated with injectable contraception are an important consideration in family planning services and may influence contraceptive continuation and adherence.

Changes in body weight, which can be conveniently assessed using body mass index (BMI), are among the commonly reported concerns among current and prospective hormonal contraceptive

users. Concerns about weight gain may influence women's decisions regarding contraceptive method selection and may affect continued contraceptive use and adherence.

BMI (kg/m²) is a widely used anthropometric indicator for assessing nutritional status in adults and is associated with the risk of metabolic diseases, including type 2 diabetes mellitus, hypertension, and cardiovascular disease. Among Asian populations, BMI cut-off points and associated metabolic risks differ from those observed in European populations, with metabolic risks potentially increasing at lower BMI levels. Therefore, interpretation of BMI data in Asian populations should take into account the World Health Organization (WHO) recommendations for Asian populations. This research is important because many women of reproductive age unilaterally discontinue the use of injectable or oral contraceptives due to the unwanted side effect of weight gain, which carries the risk of unplanned pregnancy. The estrogen and progesterone contained in hormonal contraceptives (such as birth control pills, injections, or implants) can affect the body's metabolism, stimulate appetite, and trigger fat accumulation or fluid retention. Long-term changes in Body Mass Index (BMI) leading to excess weight or obesity—driven by these hormonal effects—can increase the risk of high cholesterol, hypertension, diabetes mellitus, and cardiovascular disease. The findings of this study provide empirical data that can assist midwives and physicians in offering appropriate counseling, helping contraceptive users select methods that align with their individual physical profiles, and recommending lifestyle adjustments (such as dietary changes and physical activity). This study aimed to analyze changes in BMI before and after at least six months of hormonal contraceptive use among women of reproductive age.

METHOD

This study employed a quantitative, non-experimental approach with a retrospective cohort study design. The study population consisted of secondary data from women of reproductive age who used hormonal contraceptives and were recorded in family planning registers and medical records. The study sample comprised 44 participants. The inclusion criteria were complete records of contraceptive type, body weight, and height; use of hormonal contraception in 2025, including implants, one-month injectable contraception, three-month injectable contraception, hormonal intrauterine devices (IUDs), or oral contraceptive pills; and a documented family planning follow-up visit after six months.

The independent variable was hormonal contraceptive use, while the dependent variable was body mass index (BMI). Data were collected using a documentation form based on family planning registers and medical records, without direct anthropometric measurements by the researchers. Body weight and height data were used to calculate BMI using the formula: body weight (kg) divided by height squared (m²). BMI was categorized as underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obesity (≥30.0 kg/m²). Data processing involved checking data completeness, classification, and tabulation, followed by univariate and bivariate analyses. Bivariate analysis was performed using a paired t-test to assess differences in BMI before and after hormonal contraceptive use. Statistical significance was set at $\alpha = 0.05$.

RESULT

Table 1.
Frequency Distribution of Participants' Characteristics (N = 44)

Participant Characteristics	f	%
Type of Hormonal Contraception		
One-month injectable contraception	28	63.6
Three-month injectable contraception	16	36.4
Baseline BMI (Pre)		
Underweight (<18.5 kg/m²)	2	4.5
Normal weight (18.5–24.9 kg/m²)	23	52.3
Overweight (25.0–29.9 kg/m²)	7	15.9

Participant Characteristics	f	%
Obesity (≥30.0 kg/m²)	12	27.3
BMI after >6 Months of Use (Post)		
Underweight (<18.5 kg/m²)	0	0.0
Normal weight (18.5–24.9 kg/m²)	20	45.5
Overweight (25.0–29.9 kg/m²)	11	25.0
Obesity (≥30.0 kg/m²)	13	29.5

Table 1 the majority of the research subjects are mothers who use the 1-month injectable contraceptive—totaling 28 individuals (63.6%)—while 16 individuals (36.6%) use the 3-month injectable contraceptive. After at least 6 months of contraceptive use, a shift in trends occurred: the proportion of subjects with a "Normal" nutritional status decreased to 20 (45.5%), whereas the number of subjects in the "Overweight" category increased significantly to 11 (25.0%), and those in the "Obese" category rose to 13 (29.5%).

Table 2.
Mean Body Weight and BMI of Participants Before and After Hormonal Contraceptive Use (N = 44)

Study Variable	Minimum	Maximum	Mean	Standard Deviation
Body weight before contraceptive use (kg)	35.0	88.0	61.27	11.53
Body weight after 6 months (kg)	46.0	93.0	62.94	10.97
Baseline BMI (kg/m²)	14.94	34.11	24.64	4.33
BMI after 6 months (kg/m²)	19.15	34.70	25.81	4.12

Table 2 presents the distribution of mean body weight and BMI before and after hormonal contraceptive use. The mean body weight increased by 1.67 kg, from 61.27 kg before contraceptive use to 62.94 kg after at least six months of use. Similarly, the mean BMI increased from 24.64 kg/m² at baseline to 25.81 kg/m² after at least six months of use, representing a mean increase of 1.17 kg/m². Descriptively, this increase indicates a tendency toward higher body mass among hormonal contraceptive users at the study site.

Table 3.
Difference in BMI Before and After Hormonal Contraceptive Use (N = 44)

Variable	Mean	SD	Mean Difference	*t*-Statistic	*p*-Value	Conclusion
Baseline BMI (Pre)	24.64	4.33	1.17	2.705	0.009	Significant (H_0 rejected)
BMI after ≥6 months (Post)	25.81	4.12	—	—	—	—

The paired *t*-test showed that the mean BMI increased from 24.64 ± 4.33 kg/m² before hormonal contraceptive use to 25.81 ± 4.12 kg/m² after at least six months of use, with a mean difference of 1.17 kg/m². The analysis yielded a *p*-value of 0.009, which was lower than the predetermined significance level of $\alpha = 0.05$. Therefore, H_0 was rejected and H_1 was accepted, indicating a statistically significant difference in BMI before and after at least six months of hormonal contraceptive use among women of reproductive age at the study site.

DISCUSSION

The research results indicate that the majority of respondents are users of the one-month injectable hormonal contraceptive (28 individuals, or 63.6%), while 16 individuals (36.4%) use the three-month injectable contraceptive. These findings show that injectable contraception is the method used by the majority of respondents in this study. The choice of a contraceptive method can be influenced by considerations such as effectiveness, ease of use, convenience, access to healthcare services, and individual preferences. According to the World Health Organization (2022), injectable contraception is an effective method that should be accompanied by counseling regarding its benefits, proper usage, and potential side effects. However, the higher proportion of one-month injectable contraceptive users in this study merely reflects the distribution of the respondents surveyed and cannot be used to conclude that this method is more preferred by all women of reproductive age (WHO, 2022).

Based on the distribution of nutritional status using the Body Mass Index (BMI), this study shows that the proportion of respondents in the normal BMI category decreased from 52.3% before the use of hormonal contraception to 45.5% after at least six months of use. Conversely, the proportion of respondents in the overweight category increased from 15.9% to 25.0%, while the proportion in the obese category rose from 27.3% to 29.5%. This shift in distribution indicates a trend toward higher BMI categories during the observation period. The increase in the proportion of overweight and obese individuals in this study highlights the importance of monitoring the nutritional status of women of reproductive age who use hormonal contraception. The use of injectable contraceptives—specifically DMPA, or three-month progestin-only injections—has been linked to weight gain in some users. However, weight changes do not occur in every user and cannot be attributed solely to the use of contraception. Other factors, such as dietary patterns, physical activity, age, and metabolic conditions, may also contribute to changes in body weight. The Centers for Disease Control and Prevention (CDC, 2024) states that recording body weight and BMI at the initiation of DMPA use can assist healthcare providers in evaluating weight changes over the course of contraceptive use and in addressing any concerns raised by the user.

The results of the Paired t-Test indicate a difference in the mean Body Mass Index (BMI) before and after at least six months of hormonal contraceptive use, with a p-value of 0.009. Physiologically, weight changes during contraceptive use can vary depending on the type of hormone and individual characteristics. Evidence regarding weight gain is most consistent among users of the injectable contraceptive DMPA. Meanwhile, existing evidence does not suggest that all hormonal contraceptive methods lead to clinically significant weight gain. A statement from the Society of Family Planning (2024) asserts that most contraceptive methods do not show evidence of significant weight gain, with DMPA being one of the methods for which there is stronger evidence of such changes. Therefore, the findings of this study should be interpreted in light of the specific characteristics of the methods used—particularly given that the group of respondents included users of both 1-month and 3-month injectable contraceptives, which were not analyzed separately in the reported results.

The results of the descriptive analysis indicate that the mean body weight of the respondents increased from 61.27 kg prior to the use of hormonal contraception to 62.94 kg after at least six months of use—an increase of 1.67 kg. The mean body mass index (BMI) also rose from 24.64 to 25.81 kg/m², representing an increase of 1.17 kg/m². These findings demonstrate that the change in body weight aligns with the increase in the mean BMI. The rise in mean BMI from 24.64 to 25.81 kg/m² also has implications for the classification of nutritional status. According to the WHO's international BMI classification for adults, a BMI of 24.64 falls within the "normal" category, whereas a BMI of 25.81 falls into the "overweight" category. This suggests that the mean BMI of the respondent group shifted from the normal range to the overweight range. However, a change in the group's mean value does not necessarily mean that every individual respondent experienced the same category shift; individual shifts in category would need to be verified by comparing the initial and final BMI for each respondent. Furthermore, changes in body weight can be influenced not only by the use of contraception but also by dietary patterns, physical activity, age, and metabolic factors. The CDC (2024) states that measuring body weight and BMI at the initiation of DMPA use can assist healthcare providers in evaluating subsequent changes and addressing any concerns users may have regarding a potential link between weight change and their chosen contraceptive method.

The results of this study highlight the importance of monitoring body weight and BMI within family planning services, particularly for women of reproductive age who use hormonal contraceptives. Midwives can record a client's weight and BMI before or at the initiation of contraceptive use, and subsequently evaluate any changes during follow-up visits. Counseling should also encompass guidance on a balanced diet and regular physical activity, as well as discussions regarding any weight changes perceived by the contraceptive user. If weight gain

becomes a concern, healthcare providers should evaluate other potential contributing factors and discuss alternative contraceptive options tailored to the user's specific needs and health status. These recommendations align with CDC (2024) guidelines, which state that monitoring weight changes and addressing a user's concerns can be beneficial in the provision of injectable contraceptives, specifically DMPA (CDC, 2024).

Overall, the study of 44 women of reproductive age showed an average weight gain of 1.67 kg and an average increase in body mass index (BMI) of 1.17 kg/m² following at least six months of hormonal contraceptive use. These changes were accompanied by a decrease in the proportion of respondents with a normal BMI and an increase in the proportion of those classified as overweight or obese. A paired t-test (p=0.009) indicated that the difference in mean BMI before and after the use of hormonal contraceptives was statistically significant. These findings underscore the importance of monitoring nutritional status among users of hormonal contraceptives. However, as this study did not include a control group and encompassed two types of injectable contraceptives, the results are best interpreted as an increase in BMI occurring during the period of hormonal contraceptive use, rather than as definitive evidence that hormonal contraceptives are the sole cause of this increase. Further research—incorporating a comparison group and analysis stratified by contraceptive type—is required to clarify this relationship (Society of Family Planning, 2024).

CONCLUSION

Based on the research findings regarding the effect of hormonal contraceptive use on changes in the Body Mass Index (BMI) of women of reproductive age at an independent midwifery practice (TPMB), it can be concluded that the average BMI increased by 1.17 points, from 24.64 to 25.81. The analysis, conducted using a Paired t-Test, yielded a p-value of 0.009 ($p < 0.05$), indicating a significant effect of hormonal contraceptive use on BMI changes among women of reproductive age. Thus, the use of hormonal contraceptives for at least six months at an independent midwifery practice is associated with an increase in body weight and BMI among hormonal contraceptive users.

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