The Relationship Between Duration of Injectable Contraception Use and Increased Blood Sugar Levels

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Abstract:
Long-term use of progestin-based injectable contraception, particularly depot medroxyprogesterone acetate (DMPA), may influence glucose metabolism by increasing insulin resistance, thereby elevating the risk of prediabetes and hyperglycemia. This study aims to examine the relationship between the duration of injectable contraceptive use and blood sugar levels among family planning acceptors. A quantitative correlational study with a cross-sectional design was conducted in 2025. A total of 30 respondents were selected using purposive sampling from 150 active injectable contraceptive users. Blood glucose levels were measured using a digital glucometer through random blood glucose testing, and data on the duration of injectable contraceptive use were collected via structured interviews. Data were analyzed using the Chi-Square test with a significance level of $p < 0.05$. Most respondents were aged 26–35 years (53.3%) and had used injectable contraception for 1–3 years (40%). Overall, 40% of participants exhibited elevated blood sugar levels, categorized as prediabetes or hyperglycemia. A statistically significant association was identified between a more prolonged duration of injectable contraceptive use and elevated blood sugar levels ($p = 0.021$). Prolonged use of injectable contraception is significantly associated with elevated blood sugar levels. Routine glucose monitoring and targeted health counseling are recommended for long-term injectable contraceptive users to reduce the risk of metabolic complications.

INTRODUCTION

Injectable contraception remains one of the most widely adopted hormonal family planning methods among women of reproductive age globally, particularly in low- and middle-income countries (Anderson et al., 2025; Gemmill et al., 2023). In Indonesia, injectable contraceptives, primarily depot medroxyprogesterone acetate (DMPA), a progestin-only formulation, are favored for their high efficacy, ease of administration, and minimal need for daily adherence (Avenant et al., 2024; Polis et al., 2025). These advantages contribute to their widespread use, especially among women seeking long-acting, reversible contraception without the burden of daily pill intake. However, as their popularity endures, concerns regarding potential metabolic side effects, particularly those related to glucose metabolism, have gained increasing attention in both clinical and public health discourse (Abukres, 2025; Shah et al., 2023).

Progestin-based contraceptives, including DMPA, have been implicated in altering glucose homeostasis through several proposed mechanisms (Panou et al., 2025; García-Sáenz et al., 2023). These include the suppression of pancreatic beta-cell function, leading to reduced insulin secretion,

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and the induction of peripheral insulin resistance (Enríquez et al., 2023). Such metabolic disruptions may result in elevated fasting and postprandial blood glucose levels, collectively referred to as hyperglycemia. If sustained over time, these changes could place long-term users at an elevated risk of developing prediabetes or type 2 diabetes mellitus, particularly in the presence of additional risk factors such as obesity, sedentary lifestyle, or genetic predisposition (Maksimovic et al., 2024).

Despite these concerns, routine monitoring of blood glucose levels is not currently integrated into standard follow-up protocols for injectable contraceptive users in many primary healthcare settings in Indonesia, including private midwifery practices. This oversight is particularly concerning given that early symptoms of dysglycemia, such as unexplained weight gain, persistent fatigue, and polydipsia, are frequently reported by users but often attributed to non-metabolic causes. Without proactive screening, metabolic disturbances may go undetected until more advanced stages, potentially compromising long-term health outcomes and quality of life (Battipaglia et al., 2025; Genazzani et al., 2023).

Most existing research on the metabolic effects of injectable contraceptives has been conducted in urban hospitals or community health center settings, where access to laboratory facilities and structured monitoring is relatively consistent (Ayuk et al., 2022). However, evidence from semi-rural or private midwife clinics, which serve a large proportion of Indonesia's reproductive-age women, remains scarce. These settings often operate with fewer resources and less standardized follow-up procedures, and their patient populations may exhibit different lifestyle, dietary, and socioeconomic characteristics that could modulate the impact of hormonal contraception on metabolic health (Genazzani et al., 2025).

Against this backdrop, the present study aims to investigate the relationship between the duration of injectable contraceptive use and blood glucose levels among women attending private midwife clinics (TPMB) in Renis Vianty, Kasian Timur, Jember Regency. By focusing on a semi-rural private midwifery practice, this research aims to generate context-specific evidence that can inform more comprehensive contraceptive counseling and improve the early detection of metabolic complications. Ultimately, the findings aim to support safer and more personalized family planning services tailored to the needs of women in underserved communities (Gold et al., 2022).

METHOD

This study employed a cross-sectional analytical design to examine the relationship between the duration of injectable contraceptive use and blood sugar levels among family planning acceptors at the Renis Vianty Midwife Self-Practice (TPMB) in Kasian Timur, Jember Regency. The study population consisted of all active injectable contraceptive users registered at the TPMB from January to September 2025, totaling 150 acceptors.

Sampling was conducted using purposive sampling. Inclusion criteria were acceptors who had used injectable contraception for at least six months, a minimum duration considered sufficient for hormonal exposure to potentially influence glucose metabolism, were willing to participate, and had no prior diagnosis of diabetes mellitus. Acceptors who were pregnant, currently using other hormonal therapies, or unwilling to undergo blood glucose testing were excluded. Based on these criteria, 30 respondents were included in the study.

The independent variable was the duration of injectable contraceptive use, categorized as <1 year, 1–3 years, and >3 years. The dependent variable was blood sugar level, measured using a Random Blood Glucose (RBG) test. Capillary blood samples were obtained using an Easy Touch GCU digital glucometer. Blood glucose measurements were conducted during daytime clinic hours without fasting, and one measurement was taken per participant using standard capillary blood

testing procedures. Blood sugar levels were classified as usual (<140 mg/dL) or elevated (≥140 mg/dL) according to commonly used clinical thresholds for random blood glucose assessment.

Data were collected using structured observation sheets and interview guides that covered respondent characteristics, a history of injectable contraceptive use, and blood glucose measurement results. The interview instrument was reviewed by senior midwifery lecturers and piloted on five acceptors outside the study sample to ensure clarity and content validity. Data analysis was performed using SPSS version 25. Univariate analysis was used to describe respondent characteristics, while bivariate analysis was conducted using the Chi-Square test, as both the independent and dependent variables were categorical. Expected cell counts met the assumptions for Chi-Square analysis. A significance level of $p < 0.05$ was applied.

Ethical approval for this study was formally granted by the Ethics Committee of the Faculty of Health Sciences at the Institute of Technology, Science and Health, Dr. Soepraoen Hospital, ensuring that all research procedures adhered to established ethical standards for human subject research. Prior to data collection, each participant received a comprehensive and clear explanation of the study's purpose, procedures, potential risks and benefits, as well as their right to withdraw at any stage without penalty. Written informed consent was obtained from all participants, affirming their voluntary participation. Furthermore, strict measures were implemented to protect participants' privacy: all collected data were anonymized, stored securely, and accessible only to authorized research personnel, thereby upholding the principles of confidentiality, autonomy, and respect for persons throughout the study.

RESULT

Respondent Characteristics

The study was conducted with 30 respondents who accepted injectable contraceptives at the Renis Vianty Kasian Timur TPMB in Jember Regency. Based on the data collection results, most respondents were aged 26-35 years (53.3%), followed by those aged 20–25 years (30.0%) and those aged 36+ (16.7%). Based on education level, most respondents had a high school education (46.7%), followed by junior high school (33.3%), elementary school (13.3%), and college (6.7%). Based on occupation, most respondents were housewives (60.0%), followed by farmers (20.0%), traders (13.3%), and private employees (6.7%).

Table 1. Distribution of Respondent Characteristics Based on Age, Education, and Occupation

Characteristics	Category	Frequency (f)	Percentage (%)
Age (years)	20–25	9	30.0
	26–35	16	53.3
	>35	5	16.7
Education	Elementary School	4	13.3
	Junior High School	10	33.3
	Senior High School	14	46.7
	College	2	6.7
Work	Housewife	18	60.0
	Farmer	6	20.0
	Trader	4	13.3
	Private employees	2	6.7

According to the table, most respondents were homemakers with secondary education and were within the productive age range, reflecting the general characteristics of injectable contraceptive acceptors in the region.

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Distribution of Duration of Use of Injectable Contraceptives

The results of the study showed that of the 30 respondents, the majority had used injectable contraception for 1–3 years (40.0%), followed by those who had used it for more than 3 years (33.3%), and those who had used it for less than 1 year (26.7%).

Table 2. Distribution of Respondents Based on Length of Use of Injectable Contraceptives

Duration of Use of Injectable Contraceptives	Frequency (f)	Percentage (%)
< 1 year	8	26.7
1–3 years	12	40.0
> 3 years	10	33.3
Total	30	100.0

These data indicate that most respondents were medium to long-term injectable contraceptive users, thus allowing for metabolic changes due to long-term exposure to the hormone progestin.

Respondents' Blood Sugar Levels

Blood sugar levels were measured with a random blood glucose (RBG) test using a digital glucometer. Based on the results, 18 respondents (60.0%) had normal blood sugar levels (<140 mg/dL), nine respondents (30.0%) were in the pre-diabetic category (140–199 mg/dL), and three respondents (10.0%) had hyperglycemia (≥200 mg/dL).

Table 3. Distribution of Respondents' Blood Sugar Levels

Blood Sugar Level Categories	Frequency (f)	Percentage (%)
Normal (<140 mg/dL)	18	60.0
Pre-diabetes (140–199 mg/dL)	9	30.0
Hyperglycemia (≥200 mg/dL)	3	10.0
Total	30	100.0

Relationship between duration of injectable contraceptive use and blood sugar levels

Table 4. Relationship between Duration of Injectable Contraceptive Use and Blood Sugar Levels

Duration of Use of Injectable Contraceptives	Blood sugar levels		Total	p
	Normal	Increase		
< 1 year	7 (87.5%)	1 (12.5%)	8 (100%)	0.021
1–3 years	8 (66.7%)	4 (33.3%)	12 (100%)	
> 3 years	3 (30.0%)	7 (70.0%)	10 (100%)	
Total	18 (60.0%)	12 (40.0%)	30 (100%)	

The Chi-Square test results showed a p-value of 0.021 (p < 0.05), indicating a significant relationship between the duration of injectable contraception use and blood sugar levels among acceptors at TPMB Renis Vianty Kasian Timur. The results of this study indicate that the longer the duration of injectable contraceptive use, the higher the likelihood of elevated blood sugar levels. Respondents who had used injectable contraceptives for more than three years had a greater risk of elevated blood sugar levels than new users. Therefore, it can be concluded that the duration of injectable contraceptive use is significantly associated with blood sugar levels. Therefore, it is recommended that blood sugar levels be checked regularly, especially for injectable contraceptive users who have used injectable contraceptives for more than three years.

DISCUSSION

The results demonstrated a statistically significant association between the duration of injectable contraceptive use and elevated blood sugar levels among acceptors at TPMB Renis Vianty Kasian Timur (p = 0.021). This finding indicates that prolonged exposure to progestin-based injectable contraception is associated with a progressively higher risk of glycemic dysregulation. The marked increase in the proportion of users with elevated blood glucose levels after more than three years of use suggests a cumulative metabolic effect, supporting the hypothesis that longer durations of hormonal exposure amplify metabolic risk.

The biological plausibility of the association between prolonged injectable contraceptive use and elevated blood sugar levels is supported by evidence indicating that progestin, particularly depot medroxyprogesterone acetate (DMPA), can adversely affect glucose metabolism through multiple pathways. Progestin has been shown to suppress insulin secretion by disrupting pancreatic β-cell function and to increase peripheral insulin resistance by impairing glucose uptake in insulin-sensitive tissues such as skeletal muscle and adipose tissue (Santos et al., 2023). Over time, these combined effects may lead to a progressive decline in glucose homeostasis, resulting in impaired glucose tolerance and, potentially, the development of prediabetes or sustained hyperglycemia, especially in individuals with other metabolic risk factors (Zhou et al., 2024).

Several limitations should be considered when interpreting the results of this study. The relatively small sample size (n = 30) may limit statistical power and generalizability. The cross-sectional design precludes causal inference, and the use of random blood glucose (RBG) testing, while practical in field settings, has lower sensitivity than fasting blood glucose or HbA1c measurements. Additionally, important confounding factors such as BMI, dietary patterns, physical activity levels, and family history of diabetes were not measured, which may have influenced glucose levels independently of contraceptive use (Alrashed et al., 2023).

Despite these limitations, the findings have important implications for family planning services, particularly in private midwife practices (TPMBs), where metabolic monitoring is often not routinely integrated. These results highlight the need for regular blood glucose screening, targeted counseling on potential metabolic risks, and lifestyle modification guidance for long-term injectable contraceptive users (Mosorin et al., 2023). Integrating metabolic risk assessment into routine family planning services could enhance early detection and prevention of metabolic complications (Marc Bertrand et al., 2024; Turki et al., 2023).

Future research should adopt longitudinal study designs with larger and more diverse sample sizes to capture the dynamic relationship between injectable contraceptive use and metabolic changes over time. Such studies would benefit from incorporating comprehensive metabolic assessments, including fasting blood glucose, oral glucose tolerance tests, and HbA1c levels, and rigorously adjusting for key confounding variables such as body mass index, physical activity, dietary habits, family history of diabetes, and duration of contraceptive use. These methodological improvements would strengthen causal inference and provide deeper insights into the long-term metabolic impact of progestin-based injectables. Overall, this study underscores the critical need for proactive metabolic monitoring, routine health education, and integrated counseling for women using injectable contraceptives to safeguard their long-term health and ensure the safe, informed use of this widely accessible family planning method.

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CONCLUSION

This study demonstrates a significant association between the duration of injectable contraceptive use and elevated blood sugar levels among acceptors at TPMB Renis Vianty Kasian Timur, Jember Regency. Women who used injectable contraception for more than three years showed a substantially higher risk of increased blood sugar levels compared to short-term users. These findings suggest that prolonged exposure to progestin-based injectable contraception may adversely affect glucose metabolism. Healthcare providers, particularly midwives in primary and private family planning services, should integrate regular blood glucose screening into the care of long-term injectable contraceptive users and provide counseling on potential metabolic risks and healthy lifestyle practices. Further research using longitudinal designs with larger samples and comprehensive metabolic measurements is recommended to strengthen causal evidence and guide safer contraceptive management.

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