Differences in Random Blood Glucose Levels on Acceptors of the 1-Month Injection Contraceptive Program and the 3-Month Injection Contraceptive Program in the Working Area of the Masbagik Community Health Center

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Article Info

ABSTRACT

Glucose is one of the products of carbohydrate metabolism in the body that functions as the main source of energy for the body, controlled by insulin. This increase in blood sugar is caused by the inefficient work of insulin, which is caused by the presence of injectable contraceptives. The progesterone hormone contained in injectable contraceptives has anti-insulin properties that cause cells to become less sensitive. Reduced insulin sensitivity can lead to insulin resistance in the body, which can affect glucose metabolism and result in elevated blood sugar levels. The objective of this study is to determine the difference in blood glucose levels among participants in the 1-month injection contraceptive program and the 3-month injection contraceptive program in the Masbagik Health Center service area. The sample in this study consisted of participants in the 1-month and 3-month injection contraceptive programs, with a total of 26 respondents (13 for each group). The data collected were glucose levels measured using the POCT (point-of-care testing) method. The data were analyzed using the Mann-Whitney statistical test. The results showed that the mean glucose level in 1-month contraceptive injection program participants was 108.8 mg/dL, while in 3-month program participants it was 142.9 mg/dL. The Mann-Whitney test results showed no significant difference between the blood glucose levels of 1-month contraceptive injection users and 3-month contraceptive injection users, with a value of 0.068 (p > 0.05). The conclusion of this study is that there is no significant difference in blood glucose levels between 1-month and 3-month contraceptive injection users. However, mathematically, there is an increase in the average values.

INTRODUCTION

One of the most important health interventions for women of reproductive age is contraception. Reducing high maternal morbidity and mortality rates due to pregnancy is one of the goals of contraception programs. One of the most effective forms of contraception is hormonal contraception. Among all the side effects of hormonal contraception, blood sugar problems are the most concerning when using injections. It is hypothesized that hormones can affect the way insulin functions in sugar metabolism, thereby increasing blood sugar levels. In Indonesia, progestin and injections are the most widely used forms of contraception (Haerani et al., 2020).

Medroxyprogesterone acetate, a progestin hormone, and estradiol cypionate, an estrogen hormone, are both contained in the contraceptive device used in the 1-month injection program. The hormonal composition and mechanism of action of this 1-month contraceptive are comparable to those of combination contraceptives. The first injection is administered during the first seven days of the menstrual cycle, or six weeks after giving birth if breastfeeding. Each month, 25 mg of medroxyprogesterone acetate and 5 mg of cypionate estrogen are administered as part of the Cyclofem injection contraceptive (Rajadiah et al., 2025).

The 3-month injection contraceptive plan involves intramuscular (IM) injection of the contraceptive into a woman's buttocks every three months. The device contains hormones including DMPA (Depo Medroxyprogesterone Acetate) and NET-N. Hormonal changes, weight gain, decreased sexual desire, headaches, breast pain, spotting/bleeding, and changes in the menstrual cycle are some of the disadvantages and side effects of using injection contraceptives (Pratami, 2020).

Use of 3-month injection contraceptives is lowest in Sub-Saharan Africa and has increased globally, especially in Asia and Latin America. The percentage of people using modern injection contraceptives increased only slightly from 54% in 1990 to 57.4% in 2014 (Noriani et al., 2019).

According to data from Statistics Indonesia (BPS), West Nusa Tenggara Province in 2022, there were 973,129 fertile couples (PUS) in 2022, and 661,089 people (87.9%) received contraceptive injections. Pills: 119,284 (18.0%), condoms 33,559 (5.1%), injections: 307,623 (46.5%), IUDs 68,54 (10.4%), implants 120,819 (18.3%), MOW 8,454 (1.3%), and MOP 2,805 (10.4%) were the types of contraception received. This data shows that the NTB region still has a high rate of contraceptive injection use (BPS NTB, 2023).

Due to its anti-insulin properties, the progesterone hormone found in contraceptive injections can make cells less responsive to insulin. Insulin resistance, which can affect sugar metabolism and increase blood sugar levels, can be caused by a lack of insulin sensitivity. Diabetes mellitus (DM) can be characterized by high blood sugar levels. Random blood glucose levels are less than 200 mg/dl, while normal fasting blood glucose levels are less than 126 mg/dl. High blood glucose levels can be caused by various factors, including age over 40, obesity, diet, stress, lack of exercise, and a history of diabetes mellitus, in addition to the effects of hormonal contraceptives (contraceptive injections) (Cholifah et al., 2021).

Increased blood sugar levels in users of contraceptive injections are influenced by the duration of use of the drug. Especially after long-term use, weight gain in users also contributes to this increase in blood sugar levels. Factors such as hormonal, psychological, genetic, environmental, poor diet, and decreased physical activity are some of the factors that can contribute to weight gain in users of contraceptive injections. Users of contraceptive injections are encouraged to maintain a healthy diet and exercise in accordance with their calorie intake to avoid the accumulation of blood fat, which can ultimately increase blood sugar levels (Ariesthi & Pattypeilohy, 2019).

The results of a study conducted by Widiarti et al. (2022) at the Pitumpanua Community Health Center, Wajo Regency, which analyzed blood sugar and cholesterol levels in individuals using contraceptive injections, showed a significant correlation between blood sugar and cholesterol test results and the use of contraceptive injections (Widarti et al., 2022).

MATERIALS/METHOD

This study uses an analytical observational research design that aims to examine the causal relationship between the research variables. Based on its timing, it is classified as a cross-sectional study, where data collection and analysis of results are conducted simultaneously. The study was conducted in the service area of the Masbagik Health Center, South Masbagik Subdistrict, East Lombok Regency. The study was carried out over four months, from January to April 2025, encompassing participant recruitment, data collection, and analysis of results. The study population consists of reproductive-age women who are participants in the one-month contraceptive injection program and the three-month contraceptive injection program in the service area of the Masbagik Health Center. The sampling technique used is a saturated sample, with a total of 26 respondents.

The independent variables in this study were the use of 1-month and 3-month injections contraceptives, which were measured in women of childbearing age who had undergone the program for 1–2 years. Meanwhile, the dependent variable was the blood glucose level in 1-month and 3-month injection contraceptive users, which was obtained through examination using a POCT device and expressed in mg/dL.

A progressive statistical approach was then used to process all of the data that had been gathered. A Shapiro-Wilk normality test was used in the first phase to assess parametric assumptions. A paired sample t-test is used to determine the significance of the difference if the test results exhibit a normal distribution pattern and satisfy the variance homogeneity criteria. However, the researcher will use the Mann-Whitney non-parametric test as an alternate comparative analysis if the normality or homogeneity requirements are not satisfied.

RESULTS

Table 1. Results of Glucose Tests on Recipients of the 1-Month Injection Contraceptive Program in the Masbagik Community Health Center Working Area.

Sample Code	Glucose Level 1-Month Injection Contraceptive
S1	100
S2	130
S3	117
S4	113
S5	94
S6	112
S7	105
S8	98
S9	80
S10	111
S11	135
S12	116
S13	94
Average	108,08

Based on Table 1, it can be seen that the average random blood glucose level at the time of the 1-month injection contraceptive program was 108.08 mg/dL. The highest glucose level in the 1-month injection contraceptive program was 135 mg/dL, experienced by sample code S11, and the lowest glucose level was 80 mg/dL, experienced by sample code S9.

Table 2. Results of Random Glucose Tests on Recipients of the 3-Month Injection Contraceptive Program in the Masbagik Community Health Center Working Area

Sample Code	Glucose Level 3-Month Injection Contraceptive
S1	108
Sample Code	Glucose Level 3-Month Injection Contraceptive

S2	132
S3	100
S4	319
S5	175
S6	94
S7	112
S8	184
S9	157
S10	131
S11	116
S12	128
S13	102
Average	142,9

Referring to Table 2. It can be seen that the average random blood glucose level of acceptors of the 3-month injection contraceptive program was 142.9 mg/dL. The highest random blood glucose level among acceptors of the 3-month injection contraceptive program was recorded at 319 mg/dL, experienced by sample code S4, while the lowest random blood glucose level was recorded at 94 mg/dL, experienced by sample code S6.

Judging from the average, acceptors of the 1-month injection contraceptive program and the 3-month injection contraceptive program had differences in random blood glucose levels in general.

Table 3. Normality Test Results

Tests of Normality

	Kolmogorov-Smirnov^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
KB1	.124	13	.200*	.976	13	.953
KB3	.265	13	.013	.729	13	.001

Based on the Shapiro-Wilk test, the results showed that the 1-month injection contraceptive was normally distributed with a value of 0.953 > 0.05, while the 3-month injection contraceptive was not normally distributed with a value of 0.001 < 0.05. From these results, the data was not normally distributed, so it was followed up with a Mann-Whitney test (non-parametric).

Table 4. Mann-Whitney Test Results

Test Statistics^a

	SKOR
Mann-Whitney U	49.000
Wilcoxon W	140.000
Z	-1.822
Asymp. Sig. (2-tailed)	.068
Exact Sig. [2*(1-tailed Sig.)]	.072^b

From the Mann-Whitney test results, the Asymp. Sig. (2-tailed) The result was 0.068 > 0.05, so the conclusion is that there is no significant difference between the random blood glucose levels of 1-month injection contraceptives and 3-month injection contraceptives in the Masbagik Community Health Center working area, at a significance level of 5%.

DISCUSSION

Based on the results of examinations conducted on 26 respondents (13 from each group), it was found that the average blood glucose level in acceptors of the 1-month injection contraceptive program was 108.08 mg/dL, while in acceptors of the 3-month injection contraceptive program it was 142.9 mg/dL.

Because estrogen in monthly injection contraceptives can increase blood sugar levels and inhibit insulin's response to these increases, users may experience high blood sugar levels. As a result, injection contraceptives work in opposition to insulin. The pancreas functions less efficiently the longer it is used, leading to increased blood sugar levels (Hotmauli & Irawan, 2024).

The contents of injection contraceptives, such as DMPA with high doses of progesterone, may be the cause of the increase caused by the 3-month injection contraceptive program. Users with high insulin levels on average injection contraceptives may show abnormal glucose tolerance test results. In addition, progesterone may slow down the rate of carbohydrate absorption by the digestive tract (Nafisah & Sulistiyaningsih, 2022).

This hormonal contraceptive worsens glucose tolerance by causing moderate insulin resistance. Insulin sensitivity decreases when enilestradiol lowers insulin clearance. Carbohydrate metabolism is affected by DMPA. Blood glucose levels may increase due to several problems. Low levels of anti-insulin steroid hormones in progesterone decrease the number and affinity of insulin receptors for glucose. The ability of insulin to transport blood glucose into cells to be converted into energy and glycogen is impaired if insulin levels decrease (Muzayana et al., 2020).

The Mann-Whitney test results showed an Asymp. Sig (2-tailed) value of 0.068 (p > 0.05), which means that there was no statistically significant difference between glucose levels in recipients of the 1-month injection contraceptive program and the 3-month injection contraceptive program.

The results of this study are in line with the research conducted by Pribadi et al. (2024), which investigated the comparison of regular blood glucose levels in recipients of combination injections with progesterone injections at midwife-run clinics. The results of that study showed that there was no significant difference between blood sugar levels at 1 month and 3 months after injection (Pribadi et al., 2024).

However, the results of this study are not in line with previous research conducted by Widarti et al. (2022), which examined blood glucose and cholesterol analysis in injection contraceptive acceptors at the Pitumpanua Community Health Center in Wajo Regency. The results of the study concluded that there was a significant relationship between blood glucose and cholesterol tests in injection contraceptive acceptors (Widarti et al., 2022).

CONCLUSIONS

Based on the results of the study, it can be concluded that the average blood glucose level in the 1-month injection contraceptive program was 108.08 mg/dL. The average blood glucose level in the 3-month injection contraceptive program was 142.9 mg/dL. The Mann-Whitney statistical test showed that there was no significant difference between the blood glucose levels of participants in the 1-month injection contraceptive program and the 3-month program, with a value of 0.068 (p > 0.05). However, the p-value approaching 0.05 indicates a slight tendency toward a difference that could be considered clinically important, even though it is not statistically significant.

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