



DIFFERENCES BETWEEN FASTING BLOOD GLUCOSE LEVELS IN THE ACCEPTORS OF THREE MONTHLY (DMPA) AND CONTRACEPTIVE INJECTIONS ACCEPTOR MONTHLY (CYCLOFEM)

Fafelia Rozyka Meysetri^{1*}, Fanny Jesica²

^{1,2}Department of Midwifery Science, Syedza Saintika Institute of Health Science

* Corresponding author: fafeliarzykam@yahoo.co.id

ABSTRACT

The use of three-monthly injection contrast containing the hormone progesterone has an effect on increasing blood glucose levels. Increased blood glucose levels can cause Diabetes Mellitus. This study aims to measure blood glucose levels in three-monthly injection acceptors (DMPA) with one-month injection acceptors. This research is an observational study with a cross sectional design. This research was conducted at Puskesmas Lubuk Buaya Padang and in the Laboratory of the Biochemistry Section of the Faculty of Medicine, Andalas University from September 2018 - January 2019. The subjects of this study consisted of two groups, namely three-monthly injection (DMPA) acceptors and one-monthly injection (Cyclofem), respectively. Each consisted of 33 samples. Examination of fasting blood glucose levels was carried out using the enzymatic calorimetric method (hexokinase). Data were analyzed using t test with $p < 0.05$ was considered statistically significant. The results showed that the average fasting blood glucose level between the three monthly injection acceptors (DMPA) was 109.06 ± 3.54 mg / dl and the one-month injection (Cyclofem) was 101.89 ± 3.54 with p value = 0.158 which means $p > 0.05$. The conclusion of this study was that there was no significant difference in the mean fasting blood glucose levels between the three-monthly injection acceptors (DMPA) and the one-month injection acceptors (cyclofem).

Keywords: *fasting blood glucose, three monthly injections (DMPA), one month (cyclofem)*

INTRODUCTION

Population growth, the rate of population growth and the unbalanced distribution and age structure of the population are the main problems that are currently developing, including Indonesia. The large population without being accompanied by good quality human resources makes it difficult to increase and distribute people's welfare. The higher the population growth, the greater the effort needed to maintain the level of people's welfare.¹

Indonesia is the fourth most populous country in the world (after the People's Republic of China, India and the United States of America). Based on the results of the 2016 population census,

it shows that Indonesia's population is 254.7 million. According to the government's projection, Indonesia's population will continue to increase from 254.7 million in 2016 to 271.1 million in 2020 and to 305.6 million in 2035.²

The State Population and Family Planning Agency participates in strengthening the implementation of population development by controlling the quantity and increasing the quality of the population and directing the distribution of the population. Population development is also an effort to create harmony in conditions related to changes in the state of the population



that can affect and be influenced by the success of sustainable development.³

Efforts to control population growth are carried out through the Population, Family Planning and Family Development Program in the context of realizing the norms of a small, happy and prosperous family, and it is also hoped that they can contribute to changes in population quantity marked by changes in the number, structure, composition and distribution of a balanced population. in accordance with the carrying capacity and carrying capacity of the environment.³

One of the programs to reduce population growth is the Family Planning (KB) program.⁴ Family planning is an effort to spacing out or planning the number and distance of pregnancies using contraception. The provision of family planning services should be viewed as a women's reproductive health service in a broader context. High-quality family planning services include providing safe and suitable contraceptive options for women.⁵

The currently available contraceptives are hormonal and non-hormonal methods of contraception, in which hormonal contraception is one of the methods of contraception that has high effectiveness. The hormones contained in hormonal contraception are synthetic hormones estrogen and progesterone.⁶ This hormonal contraceptive method consists of pills, injections and implants. Hormonal contraceptives are widely used because they are relatively practical and do not reduce comfort compared to other methods such as condoms. Meanwhile, the use of hormonal contraceptives such as injections and combination pills has the most worrying side effect of using these contraceptives, namely disturbances in blood sugar levels. It is

suspected that the hormone used can affect the work of insulin in sugar metabolism thereby increasing blood sugar levels.⁷

Blood glucose level is an indicator in the diagnosis of diabetes mellitus (DM). Diabetes mellitus is a metabolic disease which is a collection of symptoms that arise in a person due to an increase in blood glucose above normal values.⁸

The results of the initial survey data show that the use of three-monthly injection contraceptives by active family planning participants during 2017 in Padang City was 56,894 people. The use of one-month injection contraceptives by active family planning participants was 23,543 people. The highest percentage of active family planning participants was found in the work area of the Lubuk Buaya Padang health center who used three-month injection contraceptives, namely 9.57% and those who used one-month injection contraception, namely 11.7%.⁹

MATERIAL AND METHODS

This study is an observational study using a cross-sectional approach. This was done at the Lubuk Buaya Padang Health Center. The samples used were 66 people, each sample consisting of 33 three-month injection acceptors (DMPA) and 33 one-month injection acceptors (Cyclofem) who met the inclusion and exclusion criteria. The sample was determined by systematic consecutive sampling. Firstly, the data was tested by using the Kolmogorov-Smirnov test, so that data were normally distributed (value $0 > 0.05$). Then continued the unpaired t test. The difference was statistically significant if the p value was < 0.05 .



RESULT

This study was conducted on 66 respondents who met the inclusion and exclusion criteria consisting of two groups, namely 33 three-monthly injection acceptors (DMPA) and 33 one-month injection acceptors (cyclofem).

Table 1
Univariate Analysis

Characteristics	Three-monthly injection (DMPA)	One month injection (Cyclofem)	<i>p</i>
	Average ± SD (year)	Average ± SD (year)	
Age	36,97 ± 1,16	39,24 ± 1,13	0,166
Length of use	6,02 ± 0,71	6,06 ± 0,58	0,961

Based on Table 1, it shows that the average age of the respondents is equal to those who use three-monthly injection (DMPA), namely 36.97 ± 1.16 years and one-month injection (Cyclofem), namely 39.24 ± 1.13 years. The unpaired t test results showed that the value of $p = 0.166$ ($p > 0.05$). This shows that there is no statistically significant difference between the two groups. While for the duration of

contraceptive use, it was equivalent to three monthly injection users (DMPA), namely 6.02 ± 0.71 years and one monthly injection (cyclofem), namely 6.06 ± 0.58 years. The unpaired t test results showed that the value of $p = 0.961$ ($p > 0.05$) and it also showed that there was no statistically significant difference between the two groups (Table 1).

Table 2.
Bivariate Analysis

Contraception	n	Average (mg/dl)	SD (mg/dl)	<i>p</i>
Three-monthly injection (DMPA)	33	109,061	3,541	0,158
One month injection (Cyclofem)	33	101,897	3,546	

Table 2. showed that the average fasting blood glucose levels at the three-monthly injection acceptors (DMPA) were higher, namely 109.06 ± 3.54 mg / dl than the average fasting blood glucose levels for one-month

injection acceptors (cyclofem), namely 101, 89 ± 3.54 mg / dl. The unpaired t test results obtained p value = 0.158 ($p > 0.05$), so it can be stated that there is no significant difference in the average blood glucose levels fasting on three



monthly injection acceptors (DMPA)

with one monthly injection acceptors (Cyclofem).

DISCUSSION

The results showed that there was no difference in the mean fasting blood glucose levels between the three-monthly injection acceptors (DMPA) and the one-month injection acceptors (Cyclofem), this is not in accordance with the research hypothesis. However, when viewed from the classification of blood glucose levels in Table 5.2, the results of the classification of blood glucose levels that experienced pre-diabetes were 58.62% for the three-month injection acceptor (DMPA), while for the one-month injection acceptor (Cyclofem) it was 41.38%. and 62.5% of the three-monthly injection acceptors (DMPA) had diabetes, while the one-month injection acceptors (Cyclofem) were 37.5%.

The increase in fasting blood glucose levels is also influenced by age, the older a person is, the more the fasting blood glucose level increases, although the results obtained are not significant but in terms of quantity, the average age of one month injection users is higher than that of three months' injection. likely to be a factor causing high fasting blood glucose levels at one month's injection. In this study the researchers did not provide a maximum age limit, so that the average age of mothers who used contraception was not a reproductive age anymore.

Age affects blood glucose levels where the risk of diabetes mellitus will increase with age, especially after the age of 40 because the number of beta cells in the pancreas that produce insulin decreases with age. The decrease in insulin production results in a reduced amount of glucose that enters the cells,

so that glucose will remain in the blood vessels and cause blood glucose levels to increase.¹⁰

Research conducted by Barenson et al, who conducted a study on the effect of using two hormonal contraceptive methods containing 20 micrograms of ethinyl estradiol and 0.15 mg of desogestrel on serum glucose and insulin levels and any observed predictor changes. The sample in this study were women from white, black and Hispanic races aged 16-33 years. This research is a quantitative study with a longitudinal study. Examination of glucose and serum insulin levels used serum insulin assay (Access Immunoassay System) and serum glucose assay (Vitros 5.1 FS Chemistry System). nonhormonal contraceptive users. Use of DMPA contraceptives experienced increases in serum glucose (2mg / dl at six months to 3mg / dl at thirty months) which were observed in the first 30 months but there was no increase thereafter. In addition, there was also an increase in insulin and glucose which was higher in obese and overweight DMPA users than DMPA users with normal weight.¹¹

In women who use hormonal contraceptives such as injections, there can be several adverse side effects to the users, one of which is an increase in blood glucose levels as a result of decreased blood glucose tolerance. The three-month injectable contraceptive formulation (DMPA) with high doses of progesterone demonstrated an abnormal glucose tolerance test in the user, with elevated insulin levels in the average patient. Its effect on carbohydrate metabolism will reduce glucose tolerance. Progesterone can also decrease the rate of absorption of



carbohydrates from the digestive system. This is related to the androgenic potency of progesterone, as well as the high and low dose of progesterone.¹²

The surge in the hormone progesterone affects carbohydrate metabolism in the form of a shift in cortisol by progestins from binding to globulin in the circulation which causes an increase in free cortisol levels, through the binding competition mechanism with globulin (transcortin), where globulin has a higher affinity to bind to progesterone than cortisol.¹³

Cortisol is the primary glucocorticoid in humans. Cortisol has effects in the body, among others, in glucose metabolism (gluconeogenesis) which increases blood glucose levels.¹⁴

Injectable contraceptives containing estrogen alone do not have a detrimental effect on glucose metabolism, but those containing progesterone do show antagonism with insulin. The injectable contraceptive formulation with high-dose progesterone exhibits abnormal glucose tolerance tests in the wearer, with elevated insulin levels in the average patient. Progesterone can also decrease the rate of absorption of carbohydrates from the digestive system of food. These are related to the androgenic potency of progesterone, as well as the high and low dose of progesterone.¹⁵

CONCLUSION

Based on the results of research on differences in blood glucose levels between three monthly injection acceptors (DMPA) and one-month injection acceptors (cyclofem), it can be concluded that there is no difference in fasting blood glucose levels between three-monthly injection acceptors (DMPA) and one-month injection acceptors. (cyclofem).

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