



Differences In Fasting Blood Glucose Levels In Acceptors Progestin Injections and Combination Injections

Siti Cholifah¹, Paramitha Amelia Kusumawardani, Miftahul Muslih², Bunga Artha Mevia Putri³

^{1,3}Midwife Professional Education Study Program Universitas Muhammadiyah Sidoarjo

²Prodi Teknologi Laboratorium Medis Universitas Muhammadiyah Sidoarjo

Jalan Mojopahit No.666 B, Sidowayah, Celep, Kec. Sidoarjo, Kabupaten Sidoarjo, Jawa Timur

Email: siticholifah@umsida.ac.id

Abstrak

Upaya pembatasan dan pengaturan jarak kelahiran sebagai tujuan untuk mewujudkan keluarga berkualitas dan keluarga sehat, pemerintah menganjurkan masyarakat untuk menggunakan alat kontrasepsi sebagai pengendalian kelahiran. Salah satu alat kontrasepsi tersebut yaitu kontrasepsi suntik. Kontrasepsi suntik merupakan alat kontrasepsi yang paling banyak digunakan oleh masyarakat Indonesia, dianggap efektif, praktis, namun mempunyai beberapa efek samping, yang paling mengkhawatirkan adalah mempengaruhi glukosa darah. Kadar glukosa darah dalam tubuh manusia yang meningkat lebih dari normal dapat merupakan gejala adanya penyakit diabetes mellitus. Tujuan dari penelitian mengetahui perbedaan kadar glukosa darah pada akseptor kontrasepsi suntik progestin dan suntik kombinasi. Desain penelitian observasional dengan menggunakan pendekatan cross sectional. Populasi penelitian seluruh akseptor suntik. Sampel penelitian diambil yang memenuhi kriteria inklusi yaitu responden bersedia diteliti, tidak ada riwayat penyakit diabetes mellitus (DM), usia kurang 40 tahun, akseptor berpuasa minimal 6-8 jam. Pengambilan sampel penelitian dilakukan dengan menggunakan teknik consecutive sampling berjumlah 50 akseptor (25 akseptor suntik progestin, 25 akseptor suntik kombinasi). Data di analisis dengan uji mann Witney dengan menggunakan $\alpha = 0,05$. Hasil penelitian menunjukkan rerata glukosa darah puasa akseptor suntik progestin lebih tinggi dari pada suntik kombinasi, hasil uji $P=0.008 < \alpha = 0,05$. Simpulan penelitian menunjukkan terdapat perbedaan yang bermakna kadar glukosa darah akseptor suntik progestin dan kombinasi hal ini berarti kontrasepsi suntik progestin memiliki dampak terhadap lebih tinggi untuk meningkatkan kadar gula darah puasa dibandingkan dengan kontrasepsi suntik kombinasi. Saran bagi tenaga kesehatan untuk mengontrol glukosa darah akseptor suntik pada akseptor yang mengalami kadar glukosa tinggi dianjurkan untuk ganti cara kontrasepsi non hormonal.

Kata Kunci: *kontrasepsi; suntik progestin; diabetes mellitus*

Abstract

Efforts to limit and regulate birth spacing as a goal to create quality families and healthy families, the government encourages people to use contraceptives as birth control. One of these contraceptives is injection contraception. Injecting contraception is the most widely used contraceptive tool by the people of Indonesia, is considered effective, practical, but has several side effects, the most worrying is that it affects blood glucose. Blood glucose levels in the human body that increase more than normal can be a symptom of diabetes mellitus. The purpose of this study is to determine differences in blood glucose levels in progestin injection and combined injection contraceptive acceptors. Observational research design using a cross sectional approach. The study population was all injectable acceptors. Samples were taken that met the inclusion criteria, namely respondents were

willing to be examined, there was no history of diabetes mellitus (DM), less than 40 years of age, acceptors of at least 6-8 hours fasting. Sampling was carried out using consecutive sampling techniques totaling 50 acceptors (25 progestin injection acceptors, 25 combined injection acceptors). Data were analyzed by Witney mann test using $\alpha = 0.05$. The results showed the mean fasting blood glucose for progestin injection acceptors was higher than for combination injections, the test results $P = 0.008 < \alpha = 0.05$. The conclusions of the study show that there are significant differences in blood glucose levels in progestin-injecting acceptors and this combination means that progestin-injecting contraceptives have a higher impact on increasing fasting blood sugar levels compared with combined injection contraception. Suggestions for health workers to control blood glucose injector acceptors at acceptors who experience high glucose levels are recommended to replace non-hormonal contraceptive methods.

Keywords: *contraception; injectable progestin; diabetes mellitus*

Article info:

Article submitted on August 15, 2020

Articles revised on September 16, 2020

Articles received on October 10, 2020

DOI: [http://dx.doi.org/10.21927/jnki.2020.8\(3\).247-252](http://dx.doi.org/10.21927/jnki.2020.8(3).247-252)

INTRODUCTION

The Family Planning Program allows couples and individuals to decide freely and responsibly the number of children and the age spacing between children (spacing) they want, how to achieve it, and ensure the availability of safe and effective information and methods (1). Indonesia is the largest country to four with the largest population of 276 million (after China, India and the United States. The population of Indonesia in 2018 reached 276 million. The population of East Java was the second largest in Indonesia after West Java 39,292,972 (2).

Efforts to limit and regulate birth spacing to create quality and healthy families, the government encourages people to use contraception as birth control. Methods of contraception that can be used to delay pregnancy, adjust birth spacing and end fertility are simple, hormonal and non-hormonal contraception methods and steady contraception(2). The use of injectable contraceptives in Indonesia is 62.77%, pills 17.24%, condoms 1.22%, IUD 7.15%, MOW 2.78%, implants 6.99%, and MOP 0.53% (3). Injecting contraceptive acceptors in East

Java by 50.4% (4). While the data on injecting contraceptive acceptors in Sidoarjo regency are 58 %(5). The use of injection contraception is the most popular and used by the Indonesian people than other contraceptives, because this contraception is considered more practical and does not reduce comfort compared to other methods of contraception such as implants, intrauterine devices (IUD) and solid contraception (contraception) (6). Injecting contraceptives have several side effects such as menstrual disorders (amenorrhea, spotting), weight gain, breast pain, headaches and increased blood glucose levels (7). Disorders of menstrual patterns and increased body weight are complaints of side effects that often occur and it can be felt directly by acceptors, however, increase in blood glucose levels can only cause complaints such as excessive thirst, frequent urination, excessive appetite and lack of energy if levels are very high and necessary (8). Examination of blood sugar so that acceptors do not know this (Nugroho S, 2014) Results of study by Rahayu in 2015, average blood glucose level of progestin injection acceptors from 30 acceptors was 147 gr / dl, this

shows that many acceptors experienced side effect of increasing glucose levels.

Injecting contraception is an effective hormonal contraceptive method for controlling pregnancy (9). Return to fertility is slower than non-hormonal contraception in the womb (IUD)(3). Injectable contraceptives containing synthetic hormones progestin and estrogen have the effect of influencing blood glucose levels. The hormone progesterone contained in injection contraception has anti-insulin properties and can make cells less sensitive to insulin which causes insulin resistance in the body, so that it affects sugar metabolism which can ultimately trigger an increase in blood sugar levels (10).

While the combination injection contains the hormones progesterone and estrogen both hormones have an antagonistic effect on blood glucose levels, which are receptors of the β cells of the pancreas that cause pleasant insulin which is the most important hormone in glucose homeostasis in the blood(11).

Blood glucose levels in the human body that increase more than normal are symptoms of diabetes mellitus (10). According to the PERKENI Consensus (2006) Fasting blood sugar levels > 126 mg / dl or random blood sugar > 200 mg / dl, the person is diagnosed with Diabetes Mellitus. Diabetes mellitus is a metabolic disease in the form of a collection of symptoms that arise in a person due to an increase in blood glucose from normal values(12).

Based on the results of an initial survey conducted in Sidoarjo primary health care that during 2019 active KB acceptors who visited primary health care were 1,967 injecting contraceptive users as many as 1,800 people (91.5%). The use of injection contraception is very high compared to other contraceptives.

The aim of this study was to determine differences in fasting blood glucose levels between progestin injection acceptors and combination injections.

MATERIALS AND METHODS

This type of research is quantitative research. with observational methods, cross sectionoanal approach. The population of this research is all injectable acceptors. Samples were taken that met the inclusion criteria, *ie* respondents were willing to be investigated, there was no history of Diabetes Mellitus (DM), less than 40 years of age, fasting for at least 6-8 hours by using consecutive sampling techniques totaling 50 acceptors (25 progestin injection acceptors, 25 injector acceptors before data were analyzed, the Shapiro -Wilk test showed that data were not normally distributed so that unpaired t-test could not be done so data analysis used the Mann-Whitney test with a 95% confidence interval and a significance level of $P < 0.05$.

RESULTS AND DISCUSSION

The contraceptive services provided range from Family Planning (KB) counseling to the selection of contraceptives and the provision of contraceptives. The contraceptives that are served are contraceptive pills, condoms, combination injections, progestin injections, implantation and removal and implantation and removal of intrauterine devices (IUD). The most widely used injection contraception service is injection contraception, more than 150 monthly.

Based on Table 1, shows the distribution of age characteristics is almost half-age 36-39 years both in progestin and combination injections. Age and characteristics of education in progestin injection acceptors are almost half of them are secondary education and most of the injectable combination acceptors are secondary education. The results of the analysis of the characteristic data are homogeneous and comparable, on each variable the p value > 0.05 is obtained.

Based on research data taken at primary health care from first February to March 15, 2020, the results of the study of 50 respondents who fit the inclusion criteria in two groups, namely the

progestin injection group and the combination injection. Calculation of frequency distribution based on characteristics of the research variables includes age and education as well as data on injecting acceptor fasting blood sugar levels which will be presented in the following table:

Table 1. Characteristics respondent

Characteristics	Progestin Injection		Combination Injecting		p
	N (25)	%	N (25)	%	
Age					
20-25 years	2	8	4	16	0,58
26-30 years	5	20	4	16	
31-35 years	6	24	6	24	
36-39 years	12	48	11	44	
Education					
Low	10	40	8	32	0,51
Middle	12	48	15	60	
Higher	3	12	2	8	

Based on Table 2. Results of normality test of fasting blood glucose variable data in both groups obtained $P < 0.05$, which means that data is not normally distributed.

Table 2. Data Normality Test Results

Fasting blood sugar	P
Progestin injection	0.001
Combination Injection	0.000

Shapiro Wilk Test

Based on Table 3, Shows average blood glucose level in progestin injection acceptors is higher, Mean \pm SD 110.36 +18.610, while mean \pm SD combination acceptor is 96.36 \pm 16.867. Mann-Whitney results obtained $P = 0.008 < 0.05$ means there is a significant difference in fasting blood glucose levels in the acceptor.

Results showed that respondents age and education were homogeneous. Almost half of respondents were 36-39 years old. This is included in category of safe age against the risk of increasing blood glucose levels, because age > 40 years increases risk of developing Diabetes Mellitus. This is due to increasing age of number

Table 3. Differences in fasting blood glucose levels in acceptors progestin injections and combination injecting.

Contraceptions	Fasting Blood Glukose Levels	p
	Average \pm SD (Mg/dl)	
Progestin Injection	110.36 + 18.610	0,008
Combination Injection	96.36 + 16.867	

Mann-Whitney test

of beta cells in pancreas that produce insulin decreases. Decreased insulin production results in reduced glucose levels entering cells, so that glucose will remain in blood vessels and cause blood glucose levels to increase (13).

The average glucose level in progestin contraceptive users is higher than combined injection acceptor, Mann-Whitney test results showed a significant difference in fasting blood sugar levels of progestin injection acceptors with combined injection. This shows that progestin-only injection contraception which contains only progestin hormone synthesis alone has a higher impact on increasing fasting blood sugar levels compared to combined injection contraception which contains two hormonal combinations, namely synthetic estrogen and progesterone. The results of this study are supported by study of Barenson *et al.* (2011). The results of research on progestin / DMPA injection contraceptive acceptor experienced a slightly higher increase in glucose and insulin compared to other hormonal contraceptive acceptors, from 24 articles results there is some literature proving influence of hormonal contraception in glycemic regulation(11). In addition, research conducted by Rahma (2019) there is a significant relationship between use of injectable hormonal contraception with an increase in blood sugar levels(14).

Progestin contraception contains progesterone at a dose of 150 mg given every 12 weeks, mechanism of action of this hormone prevents ovulation, cervical mucus becomes thick and slightly so that it reduces ability of

spermatozoa penetration, makes endometrium thin and atrophy so that it is not good for implantation of fertilized ovum, affecting speed of cervical mucus ovum transport by fallopian tubes(3). Increase in hormone progesterone has an effect on carbohydrate metabolism in form of a shift in cortisol by progestins from binding globulin in circulation which causes an increase in free cortisol levels, through mechanism of globulin binding competition, where globulin has a higher affinity for binding to progesterone than with cortisol(6). Cortisol is the main glucocorticoid in humans. Cortisol has effects in body, among others, in glucose metabolism (glucogenesis) which increases blood glucose levels.

The average combination injection is lower than progestin injection. This is caused because combination injection contains synthetic hormones progesterone and estrogen. Contraception containing estrogen does not have a detrimental effect on glucose metabolism but that contains progesterone shows antagonism with insulin hormone progesterone and estrogen as one of the factors that can affect blood glucose levels in a woman's body (15). Fluctuations in rise and fall of these hormones can affect condition of glucose levels in the body. When estrogen levels rise, the body's cells become more sensitive to insulin, helping to absorb glucose. When in the body there is a decrease in estrogen levels and an increase in level of the hormone progesterone, cells in body become more resistant to insulin, so more insulin is needed so that it can help cells absorb glucose from blood, resistance to insulin can cause glucose levels in blood increased(13).

CONCLUSION AND RECOMMENDATION

Conclusion of this study is average fasting blood glucose level of progestin injection contraceptive acceptors is higher than combined injection acceptor. There is a significant difference in fasting blood glucose levels in progestin injection acceptors and combined injection

acceptors. Recommendation this study for health workers to control blood glucose injector acceptors who experience high glucose levels and recommended to replace non-hormonal contraception methods.

REFERENCES

1. Bappenas. Bidang Pembangunan Regional Daerah. *Jakarta: Bappenas*. Jakarta; 2013.
2. Riset Kesehatan Dasar (Riskesdas). Badan Penelitian dan Pengembangan Kesehatan Kementerian RI tahun 2018 [Internet]. 2018. Tersedia pada: http://www.depkes.go.id/resources/download/infoterkini/materi_rakorpop_20%0A18/Hasil_Riskesdas_2018.pdf –
3. JNPKKR/POGI, BKKBN DJ. *Buku Panduan Praktis Pelayanan Kontrasepsi*. Jakarta: Yayasan Bina Pustaka Sarwono; 2014.
4. Dinas Kesehatan Jawa Timur. Jawa Timur; 2017.
5. Dinask Kesehatan Kabupaten Sidoarjo. Sidoarjo; 2018.
6. Fafelia R.M., Joserizal S dan MA. Perbedaan Kadar Glukosa Darah Pada Akseptor Suntik DMPA Dengan Pil Kombinasi Di Puskesmas Lubuk Buaya Padang tahun 2018. *Jurnal Kesehatan Andalas*. 2019;8(2).
7. Wulan Sari S, Suherni, Purnamaningrum YE. Gambaran Efek Samping Kontrasepsi Suntik Pada Akseptor KB Suntik. *Kesehatan Ibu dan Anak*. 2015;
8. Sari F, Pramestiyani M. Studi Komparasi Kadar Glukosa Darah Sewaktu Pada Akseptor Kb Suntik Kombinasi Dan Progestin Di Bpm Yosi Trihana Kabupaten Klaten Jawa Tengah Tahun 2015. *Jurnal Kesehatan Samodra Ilmu*. 2017;
9. Septianingrum Y, Wardani EM, Kartini Y. Faktor-Faktor Yang Mempengaruhi Tingginya Akseptor Kb Suntik 3 Bulan. *Jurnal Ners dan Kebidanan (Journal Ners Midwifery)*. 2018;
10. Meysetri FR, Serudji J, Agus M. Perbedaan Kadar Glukosa Darah Puasa pada Akseptor

- Suntik Depo Medroksi Progesteron Asetat dengan Akseptor Pil Kombinasi di Puskesmas Lubuk Buaya Padang Tahun 2018. *Jurnal Kesehatan Andalas*. 2019;
11. Manuel EC& AAA. Effect Of Hormonal Contraceptives On Glicemic Regulation. Catholic Medical Association. *Linacre Quartely* 81. 2014;
 12. Ramaiah. *Cara Mengetahui Gejala Diabetes Dan Mendeteksi Sejak Dini*. Jakarta: PT Buana Ilmu Populer; 2009.
 13. CG DAHAO. Oral Contraceptive Use And Abnormal Glucose Regulation In Swedish Middle Aged Women. *Diabetes Res Clin Pr* [Internet]. 2011;92(2):288–92. Tersedia pada: <http://web.ebscohost.com>
 14. Siti Rahma AM dan YZR. Kadar Gula Darah Pengguna Kontrasepsi Hormonal. *Jambura Nurs Journals* [Internet]. 2019;1(2). Tersedia pada: <http://ejurnal.ung.ac.id/index.php/jnj>.
 15. Glasier A, Gebbie A. Family Planning/ Contraception. In: *International Encyclopedia of Public Health*. 2016.
 16. Nugroho S, Pencegahan Dan Pengendalian DM Melalui Olah Raga. *Medikora* Vol. IX, No 1 October 2012.