

Original Research Article

Differences of lipid profile, body fat percentage, and waist circumference between childbearing age women acceptors of depot medroxy progesterone acetate contraceptive injection with non-acceptors in Padang City 2017

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ABSTRACT

Background: A hormonal contraception which considered ideal is depot medroxy progesterone acetate. There are large number of acceptors choose this contraception because this contraception is considered safe, effective, and can be used after labor. The possible side effect which can occur are increase of lipid profile, body fat percentage, and waist circumference. The purpose of this study is to see the differences between lipid profile, body fat percentage, and the waist circumference of women of childbearing age who use depot medroxy progesterone acetate injection compared with non-acceptors.

Methods: This study was observational study with a cross sectional comparative approach and was conducted at the Regional Technical Services Unit (UPTD) at Regional Health Laboratory in West Sumatera Province from December 2017 until June 2018. The samples were 46 DMPA acceptors and 46 non-acceptors. The sampling method used random sampling technique. The measurements of lipid profile was conducted with colorimetric enzymatic method, which is GPO-PAP for triglycerides, and CHOD-PAP for total cholesterol, HDL and LDL. The percentage of body fat examination was conducted using Bioelectrical Impedance Analysis (BIA). The obtained data were analyzed by using t-test. Abnormal data were confirmed by Mann-whitney non-parametric test with $p < 0.05$.

Results: The results showed a significant difference between DMPA acceptors and non-acceptors ($p < 0.05$). In total cholesterol ($p = 0.000$), LDL ($p = 0.000$), triglycerides ($p = 0.000$), body fat percentage ($p = 0.007$), body mass index ($p = 0.004$), and waist circumference ($p = 0.001$). But, in HDL there was no significant difference between DMPA acceptors and non-acceptors with p value = 0.302 ($p > 0.05$). There were significant differences in total cholesterol, LDL, triglycerides, fat percentage, body mass index, and the circumference of waist in both DMPA acceptors and non-acceptors. There were no significant difference in HDL levels between DMPA acceptors and non-acceptors.

Conclusions: There were significant differences in total cholesterol, LDL, triglycerides, fat percentage, body mass index, and waist circumference between DMPA acceptors and non-acceptors. There was no significant difference in HDL between DMPA acceptors and non-acceptors.

Keywords: Body fat percentage, DMPA, Lipid profile, Waist circumference

INTRODUCTION

Indonesia is the fourth most populous country in the world after China, India and America. Based on population census data in 2010, Indonesian population is 237,641,326 people with population growth rate of 1.36% in 2016. This number will continue to grow until 2020 and will affect maternal and infant mortality in Indonesia.¹

In overcoming this population growth, the government made a birth control effort through a family planning program. Based on data from National Population and Family Planning Board (BKKBN), active contraception participants were 23,361,189 participants with the most participants use contraceptive injection, amounting to 18,867,701 (49.55%).²

Based on data from the Padang City Health Office in 2016, the largest number contraceptive injection participants were in the Padang Timur region, namely 2851 people (47.59%) and in the Kuranji region, namely 5,559 (58.30%).³

Contraceptive injection method is considered as an ideal contraceptive, especially depot medroxy progesterone acetate (DMPA) injection. Numerous acceptors choose this method because it is safe, effective, does not require monthly visit, and can applied immediately after childbirth. Although its effectiveness, there are side effects that can be caused from contraception.⁴

DMPA is a contraception that only uses progesterone. The use of progesterone alone can cause estrogen levels to decrease, because the estrogen functions contrary to progesterone, one of which is the fat metabolism. It is known that progesterone can reduce HDL levels and increase LDL levels in the body, so that LDL is accumulated in the body.⁵

In theory, progesterone also stimulates the appetite control center in the hypothalamus by activating neuropeptide Y, resulting an increase in appetite which will affect the percentage of body fat, body mass index, and waist circumference of its users.^{6,7}

The research conducted by Youzbaki (2011) in Iraq regarding lipid profiles in 30 subjects using DMPA showed higher mean triglyceride levels in DMPA acceptors, namely (170.26±58.74) mg/dl than non DMPA acceptors, namely (147.74±74.76) mg/dl with $p = 0.226$ ($p > 0.05$), which means that there were no statistically significant differences in the two groups.⁸

Research conducted by Gisele (2017) in Brazil showed that the mean BMI of DMPA acceptor group was higher (24.88±3.43) than the IUD acceptor group, namely (24.56±2.84) with p value = 0.007 which means that there was a difference in BMI between DMPA and IUD acceptor.⁹

Research conducted by Bonny (2009) stated that most DMPA acceptor fat percentage was 20-30% with body mass index ranged from 18.5 to 24.9, showing p value < 0.05 , which means that there was no difference in DMPA users with fat percentage and body mass index.¹⁰

According to the research conducted by Mey Elisa (2015), the mean waist circumference of DMPA injection users was greater than that of users of oral contraceptive by comparison (0.933:0.189). The difference test results obtained $p = 0.015$ ($p < 0.05$), which means that there was a significant difference between the waist circumference of DMPA users and oral contraceptive users.¹¹

METHODS

This study was an observational study with comparative cross-sectional design. The examination of lipid profiles was carried out in the Regional Technical Services Unit (UPTD) Regional Health Laboratory of West Sumatra Province December 2017 to June 2018. The number of ethical approval committee 311/KEP/FK/2017. The population in this study were all DMPA acceptors and non-acceptors in Padang Timur and Kuranji Districts. The chosen research subjects were those who met the inclusion and exclusion criteria.

The inclusion criteria were the women of childbearing age aged 25-45 years, married, no history of metabolic syndromes or hereditary disease, and using DMPA injections for > 1 year. Non-acceptors criteria were those who do not use contraception after 2 years minimum. The number of subjects was calculated using the hypothesis test formula for the mean of two independent populations. Based on this formula, the results obtained for DMPA acceptors ($N = 46$) and non-acceptors ($N = 46$).

Examination of lipid profiles was carried out using enzymatic colorimetric methods, namely GPO - PAP for triglycerides, and CHOD-PAP for total cholesterol, HDL, and LDL.

Examination of body fat percentage was carried out using Bioelectrical Impedance Analysis (BIA). Data were analyzed using the T-Independent test and non-parametric test, the Mann-Whitney test. The results were consideration to have significant differences if $p < 0.05$.

RESULTS

After conducting research and results examination, each group consisted of 46 DMPA acceptors and 46 non-acceptors with a total sample of 92 people. The results are shown in the following table.

Table 1 showed that the average age of respondents who use DMPA were (36.24±6.17) years, and non-acceptors (35.43±6.95) years.

Table 2 showed that the average cholesterol level was (226.37±24.89) mg/dl in the DMPA acceptor group and (175.78±18.77) mg/dl in the non-acceptor group. The mean results were higher in DMPA acceptors than non-acceptors, with p = 0,000 (p<0.05). The average HDL levels were (58.02±10.37) mg/dl in the acceptor group and (56.09±7.23) mg/dl in the non-acceptor group. The mean results obtained were higher in DMPA acceptors than non-acceptors with p = 0.302 (p>0.05). The average LDL levels were (146.11±23.03) mg/dl in the acceptor group and (104.26±16.96) mg/dl in the non-KB acceptor group. The average results obtained were higher in DMPA acceptors than non-KB acceptors with p = 0.000 (p<0.05). The average triglyceride levels were (108.20±35.04) mg/dl in the acceptor group and

(74.74±19.33) mg/dl in the non-acceptor group. The average results obtained were higher in DMPA acceptors than non-acceptors with p = 0.000 (p<0.05). There were significant differences in total cholesterol, LDL, and triglycerides between DMPA acceptors and non-acceptors (p<0.05), but there was no significant difference in HDL (p>0.05).

Table 1: Age characteristics of respondents.

Characteristics	Groups	n	Mean±SD (years old)
Age	Acceptor	46	36.24±6.17
	Non-acceptor	46	35.43±6.95

Table 2: Differences in lipid profiles in respondents.

Lipid Profile	Groups	n	Mean±SD (mg/dl)	p
Cholesterol	Acceptor	46	226.37±24.89	0.000
	Non-acceptor	46	175.78±18.77	
HDL	Acceptor	46	58.02±10.37	0.302
	Non-acceptor	46	56.09±7.23	
LDL	Acceptor	46	146.11±23.03	0.000
	Non-acceptor	46	104.26±16.96	
Triglycerides	Acceptor	46	108.20±35.04	0.000
	Non-acceptor	46	74.74±19.33	

Table 3: Differences in fat percentage, BMI, and waist circumference of respondents.

Variables	Groups	n	Mean±SD (mg/dl)	p
Fat Percentage (%)	Acceptor	46	37.89±7.02	0.007
	Non-acceptor	46	34.37±6.49	
BMI (kg/m ²)	Acceptor	46	26.50±4.20	0.004
	Non-acceptor	46	24.07±3.63	
Waist circumference (cm)	Acceptor	46	87.34±8.41	0.001
	Non-acceptor	46	80.42±10.89	

Table 3 showed the body fat percentage, body mass index, and waist circumference in both DMPA acceptor and non-acceptors groups.

The test results between DMPA acceptor fat percentage showed a mean (37.89±7.02%) and non-acceptors (34.37±6.49) %. These results indicated that mean fat percentage was higher in DMPA acceptor than non-KB acceptors with p = 0.007 (p<0.05).

The DMPA acceptor body mass index showed a mean (26.50±4.20) kg/m² and non-acceptors (24.07±3.63) kg/m². These results indicated that mean BMI was higher in DMPA acceptor than non-acceptors with p = 0.004 (p<0.05). The DMPA acceptor waist circumference showed a mean (87.34±8.41) cm and non-acceptors (80.42±10.89) cm. These results show higher that mean

waist circumference was higher in DMPA acceptor than non-acceptors with p = 0.001 (p<0.05).

There were significant differences in body fat percentage, body mass index, and waist circumference between DMPA acceptors and non-acceptors (p<0.05).

DISCUSSION

In this study, there were significant differences in total cholesterol, LDL, triglycerides, body fat percentage, body mass index, and waist circumference between DMPA acceptors and non-acceptors with p<0.05, whereas in HDL there was no significant difference with p>0.05.

DMPA has the properties of glucocorticoids which can also increase lipolysis (breakdown of triglycerides in

adipose tissue into free fatty acids and glycerol), which is then carried to liver to reform triglycerides, thus increasing triglyceride synthesis which is formed by the free fatty acids (re-esterification).

The increase in triglyceride synthesis in the liver will cause an increase in VLDL secretion that will enter the blood circulation. This increase in VLDL causes an increase in triglycerides production from the liver into the blood, which in turn increase LDL. Increasing LDL levels will cause HDL levels to decrease, and also causing cholesterol to increase.^{12,17}

This is consistent with research conducted by Yadav (2011) in Nepal, which showed a significant difference in total cholesterol levels between DMPA users (5.53 ± 1.08 mg/dl) and control (4.15 ± 0.66 mg dl, with p value = 0.001 ($p < 0.05$)).¹³

Research conducted by Dasuki (2008) showed the mean HDL levels in DMPA acceptors (61.16 ± 15.69 mg/dl) and non-acceptors (80.32 ± 15.05 mg/dl) with $p = 0.821$ ($p > 0.05$). Both groups did not show significant difference between DMPA acceptors and non-acceptors. However, HDL levels are still within normal limits.¹⁴

In theory, DMPA can provide side effects in body fat accumulation, this is because the content of progesterone alone can increase LDL levels in the blood, which is insoluble in water.¹¹

Another theory also stated that glucocorticoids found in DMPA have an impact on increasing neuropeptide Y secretion which lead to increasing appetite, so that it will affect BMI, fat percentage, and waist circumference.^{15,16}

This is consistent with research conducted by Gisele (2017) in Brazil which stated that there was a difference in body mass index between DMPA and IUD users after 12 months, proved by statistical tests, where DMPA users (24.88 ± 3.43 kg/m²) and IUD users (24.56 ± 2.84 kg/m²) with $p = 0.007$ ($p < 0.05$).⁹

CONCLUSION

There were significant differences in total cholesterol, LDL, triglycerides, fat percentage, body mass index, and waist circumference between DMPA acceptors and non-acceptors. There was no significant difference in HDL between DMPA acceptors and non-acceptors.

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