Additional Weight and Improvement of Blood Pressure in Hormonal Contraception Acceptors

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Research Article

Additional Weight and Improvement of Blood Pressure in Hormonal Contraception Acceptors

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ABSTRACT

Background:: DMPA injections and pills are the most popular types of hormonal contraceptives. These contraceptives have high effectiveness, but also cause side effects for acceptors such as weight gain and increased blood pressure. Of the 7431 PUS in the working area of Kertak Hanyar Health Center, 2663 (35.83%) pill acceptors and 4371 (58.82%) injection acceptors. In a preliminary study of 10 injection and pill acceptors, 7 (70%) had weight gain and 6 (60%) had increased blood pressure.

Methods:: was to analyzed the effect of hormonal contraceptive use, duration of use, dietary patterns on weight gain and increased blood pressure in the Kertak Hanyar Community Health Center, Banjar Regency. This type of research was analytic survey with *pre-experimental design* with *pretest-posttest design*. The instruments used were a questionnaire, interview guide, body scale, tensimeter, family planning participant card and family planning register. The population was 99 people who accept DMPA injection and combination pills. data was analyzed *Univariate, bivariate* with *Chi Square* and *Mann-Whitney test*, *multivariate* with *multiple linear regression*.

Results:: The results showed that 74 (74.4%) acceptors gained weight and 51 (51.5%) had increased blood pressure. There is an effect of hormonal contraceptive use (ρ = 0.040) and length of use (ρ = 0.021) with weight gain. There is no effect of dietary consumption on weight gain (ρ = 0.296). The increase in blood pressure was influenced by the duration of use (ρ = 0.003) and diet (ρ = 0.010). Meanwhile, the use of hormonal contraceptives had no effect on increasing blood pressure (ρ = 0.562).

Conclusions:: The use of hormonal contraceptives has the greatest effect on weight gain, the value of *exp (B)*= 3.352, and the length of time using contraception has the greatest effect on increasing blood pressure *exp (B)*= 0.925.

Keywords: hormonal contraceptive acceptors, body weight, blood pressure.

INTRODUCTION

The government is taking anticipatory steps to reduce the high rate of population growth through the 2015-2019 Medium Term Development Plan (RPJM) strategy to achieve a balanced population condition, one of which is the implementation of improved family planning services using the Long-Term Contraception Method (MKJP) to reduce the risk of dropping. -out and the use of the Non-Long-Term Contraception Method (Non-MKJP) by providing continuous information for the continuity of family planning participation and the provision of continued family planning services by considering the principles of Rational, Effective and Efficient (REE)(1)

The most popular method of hormonal contraception is the injection of *Depo Medroxy Progesterone Acetate* (DMPA) and a pill that includes a combination pill containing the hormones estrogen and progesterone, and a progesterone pill containing the hormone progesterone.(2) The hormonal contraceptive method is one of the contraceptive methods that has high effectiveness, but also has several side effects such as disruption of menstrual patterns and weight gain.(3) The side effects of excess progesterone on the cardiovascular system can cause changes in blood pressure. In addition, the content of depoprovera stimulates the appetite control center.(4)

The 2007 Riskesdas report shows that the prevalence of hypertension among Indonesian women occurs at the age of 34-35 years. It is suspected that this condition is related to the use of hormonal contraceptives(5) Lubianca, from the

results of his research, showed a significant decrease in blood pressure in hormonal contraceptive acceptors who stopped using it.(6) The results showed an association between the incidence of hypertension and the use of hormonal contraceptives.(7) Research in Korea shows the use of oral contraceptives increases blood pressure. *The Nurses' Health Study* reported that oral contraceptive use increased the risk (rr = 1.8) compared with never using it. The risk of increasing blood pressure is related to race, family history of hypertension, obesity, diet / food intake, smoking and length of use of combined hormonal contraceptives.(8) The risk of developing hypertension increases with the length of time using the contraceptive pill.(8) The results of the study by Nafisah et al. (2014) stated that there was a significant relationship between the length of time using birth control pills and the incidence of increased blood pressure. Where acceptors with a duration of use of birth control pills> 2 years have a 10.09 times greater risk of developing hypertension than those with duration of use ≤ 2 years.(10)

Disorders of the hormonal balance of hormonal birth control acceptors due to the use of synthetic estrogen and progesterone hormones can have an effect on the body. The use of estrogen can inhibit the secretion of FSH (*Folicle Stimulating Hormone*) and likewise the use of synthetic progesterone can inhibit the secretion of LH (*Luteinizing Hormone*), so that if the secretion of FSH and LH is inhibited there will be an imbalance of the hormones estrogen and progesterone which will spur disturbances in blood vessels. which is manifested by an increase in blood pressure.(3)

Weight gain in DMPA injection acceptors is the most common side effect. Most DMPA acceptors will experience a weight gain of 5% in the first 6 months.[11] Research by Berenson and Rahman (2009) states that during 36 months of using DMPA, there was an increase in body weight of 5.1 kg, body fat of 4.1 kg and body fat percentage of 3.4%.(9) Pratiwi, et al (2014), stated that 23 acceptors (57.50%) experienced an increase in body weight. Part of the mean weight gain over one year was> 0 - 1 kg (47.8% acceptors). The mean body weight before and after DMPA contraceptive use was 54.4 kg 58.1 kg.(10)

Weight gain due to use of DMPA contraceptives is associated with the regulation of appetite and body fat levels. One study found an increase in appetite for contraceptive use after 6 months.[14] This can be attributed to the progesterone hormone contained in DMPA which will stimulate the central nervous system for appetite control in the hypothalamus which results in increased appetite.[15] The use of pill contraceptives in South Kalimantan Province 308,908 acceptors (48.41%) of the 638,063 active family planning participants. Likewise, in Banjar District, the use of pill contraceptives was quite dominant, namely 46,494 (50.85%) of 91,435 active family planning participants. Of the 7341 PUS in the working area of the Kertak Hanyar Puskesmas, most of them were 2663 (35.83%) pill acceptors and 4371 (58 , 82%) Injectable acceptors.[16] The results of a preliminary study at the Kertak Hanyar Health Center, were obtained from 10 acceptors who usedinjection contraceptives, *Depo Medroxy Progesterone Acetate* 7 acceptors experienced weight gain. Experienced body weight gain varies with a range between 1 - 6 kg. And of the 10 pill acceptors with a duration of ≤ 4 years, 4 acceptors (40%) did not experience an increase in blood pressure, while 6 acceptors (60%) experienced an increase in blood pressure.

The most common side effects complained about by users of hormonal contraceptives are weight and blood pressure problems. weight gain and increased blood pressure. The purpose of this study was to analyze the effect of hormonal contraceptive use, duration of use and dietary consumption patterns with weight gain and increased blood pressure and to analyze the greatest effect on weight gain and increased blood pressure.

METHODS

This study was used an analytical survey. Analytical research survey is a study to study the dynamics of the correlation between phenomena, both between risk factors and effect factors, and vice versa. The research design / building design used was *experimental design* with *pre-pretest-posttest*.(11)

This research was conducted by giving a *pretest* (initial observation) on initial body weight and initial blood pressure before using contraceptive pills / injections before being given intervention by observing the FP participant card. After being given the intervention, thencarried out *posttest* / final observation wasthrough measuring body weight and blood pressure after using contraception.

Samples were 99 people who came to the Kertak Hanyar Puskesmas work area and the combination pill. Sampling technique by *accidental sampling*. The time for data collection starts from 30 June to 11 August 2018. Data collection uses primary and secondary data sources. Primary data collection was obtained using a research instrument in the form of a questionnaire, weighing injection contraceptive

acceptors to determine the acceptors' weight gain, measuring acceptors' blood pressure and through interviews to ask about the length of contraception use and acceptors' body weight before using injection contraception. Secondary data were obtained from family planning participa cards and family planning report registers in the Kertak Hanyar Community Health Center, Banjar Regency. Data processing which includes *editing, scoring, coding, processing and cleaning*. The data analysis technique used was univariate, bivariate and multivariate analysis.

Statistic analysis

The data obtained was stored and analyzed using SPSS software and th variables are described as percentages. Data were analyzed using the Fisher's Exact Test. P values <0.05 were considered statistically significant.

RESULTS

Demographic Data

1. Univariate Analysis

The results showed that the most widely used hormonal contraceptive use was injection contraception, namely 60 acceptors (60.6%). The mean length of contraceptive use was 49.53 months (4 years). The diet of the acceptors on average has a good diet.

As many as 74 acceptors (74.7%) experienced weight gain and 25 acceptors (25.3%) did not experience weight gain. Average weight gain of 6 kg. 51 people (51.5%) experienced an increase in blood pressure and 48 acceptors (48.5%) did not experience an increase in blood pressure.

2. Bivariate Analysis

Tables 1 and 2 show that most of the use of contraceptive pills 34 people (87.2%) and injection 40 people (66.7%) experienced weight gain. Most of the pill acceptors 2 (56.4%) and 29 people (48.3%) experienced an increase in blood pressure.

Table 1: Effects of Contraceptive Use Hormonal Against Increase Weight

Contraceptive Use	Weight Gain				ρ
	Up		No		
		n%		n%	0,040
Pil	34	87.2	5	12.8	
Injection (DMPA)	40	66.7	20	33.3	

Table 2: Effects of Contraceptive Use Hormonal Against Improvement Blood Pressure

Contraceptive Use	Increased Blood Pressure			ρ	
	Go up		No.		
	n	%	n	%	0.562
Pills	22	56.4	17	43.6	
Injections (DMPA)	29	48.3	31	51.7	

The use of the contraceptive pill experienced an increase in blood pressure and greater weight gain compared to the use of DMPA injection contraceptives. The results of thetest *Chi Square* with a value of ρ = 0.040 <α = 0.05, which means that there is an influence between contraceptive use and weight gain. However, the increase in blood pressure showed no effect, namely ρ = 0.562

.

Table 3: Effects of Duration of Use of Contraception on Weight Gain and Increased Blood Pressure

	Usable			
	Weight		Blood Pressure	
	Rise	Not	Up	Not
Mean	54.6	34.4	60.2	38.2
Standard Deviation	46.0	27.2	49.8	30.5
Minimum	12	3	15	3
Maximum	276	million		96.27612
ρ	0,021		0,003	

Table 3 shows that the acceptors who experienced weight gain had an average duration of use of 54.6 months (4.6 years). The results of the test *Mann-Whitney* obtained a value of ρ = 0.021 <α = 0.05, which means that there is an influence between the length of time using contraception on weight gain. Meanwhile, the food consumption pattern shows the value of ρ = 0.296> α = 0.05, which means that there is no effect between dietary consumption on weight gain.

Table 4: The Effect of Diet on Weight Gain and Increased Blood Pressure

	Consumption Pattern Eating			
	Weight		Blood Pressure	
	Rise	Not	Up	Not
Mean	12.0	11.5	12.4	11.3
Standard Deviation	2.4	1.8	2.2	2.2
Minimum	5	8	7	5
Maximum	16	5	16	15
ρ	0,276		0.010	

Table 4 showed the acceptors who experienced an increase in blood pressure with an average duration of use of 60.2 months. The results of the test *Mann-Whitney* obtained a value of ρ = 0.003, which means that there was an influenced between the length of use of contraception on the increase in blood pressure. The dietary consumption pattern shows a value of ρ = 0.010 <0.05, which means that there is an influence between dietary consumption and increased blood pressure.

Multivariate Analysis

a. Effect of Hormonal Contraception on Weight Gain.

test resulted *Logistic Regression there was multiple* used of hormonal contraception has a value of *exp (B)*= 3.352, greater than the length of used of contraception with *exp (B)* =0.782. So that the one that has the greatest influence on weight gain is the use of hormonal contraceptives.

Effect of Hormonal Contraception on Increased Blood Pressure

Result of test *Logistic Regression double the* duration of used of contraception with *exp (B)* =0.925 is greater than the dietary consumption pattern having the value of *exp (B)*= 0.779,. So that the one has the greatest effect on increasing

blood pressure is the length of time using contraception.

DISCUSSION

Effect of hormonal contraceptive use on weight gain.

The results showed that the most widely used hormonal contraceptive use was injection contraception, namely 60 acceptors (60.6%). Most of the use of contraceptive pills (87.2%) and injection (66.7%) experienced an increase in body weight. Most of the pill acceptors 22 (56.4%) and 29 people (48.3%) experienced an increase in blood pressure.

One of the most common side effects of hormonal contraception is the weight gain experienced by hormonal contraceptive acceptors. In accordance with the research of Pratiwi (2014) which states that there is a relationship between the use of DMPA injection contraception and weight gain.

The weight gain experienced by hormonal contraceptive acceptors varies from normal, excessive to very excessive. Although the research results show that the respondents' weight gain is normal, it can be abnormal if the hormonal imbalance that causes increased appetite continues.

The results of the test *Chi Square* showed that the value of ρ = 0.040 indicated that the use of hormonal contraception had an effect on weight gain. The use of hormonal contraceptives has the greatest effect on weight gain (*exp (B)*= 3.352.)

The effect of injectable contraceptives on changes in body weight is that the content of the hormone progesterone in the form of the synthetic hormone *Depo Medroxy Progesterone Acetate* facilitates the metabolism of changes in carbohydrates and sugars into fat so fat under the skin increases and decreases physical activity.[1] In addition, the hormone progesterone also stimulates the appetite control center in the hypothalamus which causes appetite to increase so that the acceptors eat more than usual. As a result, the use of contraception can cause changes in body weight, including weight gain.(12)

Obesity that occurs in hormonal contraceptive acceptors (DMPA injection) is basically due to the hormone progesterone which can cause appetite to increase when doses are high and excessive because according to experts DMPA stimulates the appetite control center in the hypothalamus which causes acceptors to eat more than usual.(13)

Increased levels of estrogen and progesterone in the blood are associated with body metabolism.[3] Slow metabolism can lead to weight gain because women have less muscle than men. Muscle burns more calories than other body tissues so that metabolism in women is much slower than in men. This results in women being fat more easily than men.

The Effect of Duration of Hormonal Contraceptive Use on Weight Gain.

The results showed that the average length of time using hormonal contraceptives was 49.53 months (4 years). The results of the test *Mann-Whitney* obtained a value of ρ = 0.021, which means there is an effect of the length of time using hormonal contraceptives on weight gain.

Hormonal contraceptives should ideally be used for 2 years and a maximum of 4 years. Long-term use of hormonal contraceptives can lead to weight gain, vaginal dryness, cancer, emotional disturbances because the balance of the hormones estrogen and progesterone in the body is messed up, which can lead to abnormal cell changes.(10)

On prolonged use of progesterone (long term) causes weight gain due to anabolic changes and stimulation of appetite. This happens because the hypothalamus is a control system that affects the absorption of food and stimulates appetite. A mild gain of 1-2 kg is often experienced by acceptors, then stabilizes after continued use but a small number of women continue to gain moderate weight during their use of the method.

Effect of Dietary Consumption on Weight Gain

The results of the test *Mann-Whitney* obtained a value of ρ = 0.298, which means that there is no effect of dietary consumption on weight gain.

Excessive weight gain is one of the side effects of using hormonal contraceptives, but not all acceptors will gain weight, because the effect of these drugs is not always the same in each individual.[3]

Weight gain in hormonal family planning acceptors can occur not only due to excessive diet, but also due to reduced physical activity. The increase can be caused by other things, one of which is the mother's job. Most of the respondents' characteristics work as housewives, namely 78 respondents (78.8%). Mothers who do not work are likely to lack physical activity, especially for mothers who have household assistants who help with household chores. So it tends to do activities that do not spend too much energy, so that the intake of nutrients that is put into the body is not balanced with the energy expended through physical activity that is carried out or that which is expended through sweating or burning fat. Thus, mothers who do not work will be more likely to experience weight gain. As

stated by Proverawati (2010) that a person with inadequate physical activity can increase the prevalence of obesity.(14) Psychological factors are often referred to as factors that encourage excess weight gain. Emotional disturbance due to psychological pressure when a person feels anxious, sad, disappointed or depressed, usually tends to eat more food to deal with these unpleasant feelings. According to psychoanalytic theory, weight gain can be explained like someone with a feeling of anger that is always suppressed will bring up in the form of eating.(15)

The Effect of Hormonal Contraceptive Use on Increased Blood Pressure

The results of the statistical test showed that the *Chi-Square* value of $\rho = 0.562 \geq \alpha = 0.05$, meaning that there is no effect between the use of contraception and an increase in blood pressure.

The used of hormonal contraceptives can cause different side effects for each acceptor who uses it. One of the side effects that can occur in hormonal birth control acceptors is an increase in blood pressure. but not all use of hormonal contraceptives can result in an increase in blood pressure.

Hormonal contraception can cause hypertension in approximately 4-5% of women with normal blood pressure before using hormonal contraception. The risk of increasing blood pressure is related to race, family history of hypertension, obesity, dietary food intake, smoking and length of use of combined hormonal contraceptives.[8]

Effect of Hormonal Contraception Usable against Blood Pressure Increased

Old use of hormonal contraception increased blood pressure an average of 60.2 months (> 5-year), with the value $\rho = 0.003$, which means there is influence between the old use of contraceptives with increased blood pressure . Duration of use of hormonal contraceptives has the greatest effect on increasing blood pressure (*exp (B)* =0.925).

Prolonged use of hormonal contraceptives in women over 35 years of age and in those who use contraception more than 5 years and obese individuals can cause hypertension.(16) Nafisah's research (2014) states that there is a significant relationship between the length of time using pill contraceptives and the incidence of increased blood pressure where the acceptors and the length of time using birth control pills are> 2 years.[10]

The Effect of Diet on Increased Blood Pressure

The results of the statistical test *Mann Whitney* showed that the value of $\rho = 0.003 \leq \alpha = 0.05$, meaning that there was an effect of contraceptive use on the increase in blood pressure.

The results showed that 30 respondents who did not adjust their dietary consumption patterns because there was a habit of eating a dinner pattern after nine o'clock at night and a bad diet so that they were overweight and caused hypertension. This condition shows that mothers who do not adjust their diet mostly experience an increase in blood pressure. This is in accordance with the theory of Varney (2010) which states that women who use hormonal contraceptives can cause weight changes due to excessive progestin content and increased appetite, depression, fatigue, symptoms of hypoglycemia, decreased libido, neurodermatitis, weight gain, hypertension and limb dilation.

Declaration

Ethical approval and consent to participate

This research was declared to have passed the ethical test by the Health Research Ethics Commission, Banjarmasin Health Polytechnic (KEPK - PKB) Number 256 / KEPK-PKB / 2018, besides that respondents who agreed to take part in this study signed a letter of voluntary approval.

Availability of data and materials All data are publicly available.

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Disclaimer

The funding agencies had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

CONFLICT OF INTEREST

All authors have not interests to declare.

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