Depo Medroxy Progesterone Acetate (DMPA) injection contraception towards hypertensions

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Abstract. The most widely used contraceptive method in Indonesia is hormonal contraception with injection types. Depo Medroxy Progesterone Acetate (DMPA) is a type of injection contraception that is widely used, ordinary people know it as a 3-month birth control injection. The 3-month injection contraception has advantages and disadvantages. One side effect of progesterone hormone content in the cardiovascular system can lead to the increased of bloodpressure. This study aims to determine the relationship between the duration of 3-month injection contraception usage and the incidence of hypertension in mothers of Dukuh Village, Bayat District, Klaten Regency. This study uses a descriptive correlational design with a cross sectional approach. Probability sampling was used as a sampling technique with a simple random sampling method with a total sample of 52 respondents. The statistical test used was kendall tau. The research results obtained p value 0.00 (p value <0.05), so it can be concluded that there is a relationship between the duration of 3-month injection contraception usage and the incidence of hypertension in mothers of Dukuh Village, Bayat District, Klaten Regency.

1. Introduction
Indonesia is a country that has a high population density. Badan Pusat Statistik (BPS) said an increase in population has occurred in Indonesia every year. The total population of Indonesia in 2016 was 258,704,986 inhabitants. Central Java Province ranks third with a population of 34,019,095 inhabitants [1]. This can cause problems in the quality of Human Resources (HR). For this reason, the Government plans the Family Planning (KB) program by emphasizing the use of contraceptives to achieve the norm of a happy and prosperous small family. Family planning (KB) according to UU RI No 52 S 2009 concerning on family development is an effort to regulate child birth, distance and ideal age of childbirth, regulate pregnancy through promotion, protection and assistance in accordance with reproductive rights to create a quality family. One of the programs launched by KB is the use of contraceptives. Contraception is the prevention of pregnancy as a result of meeting between a mature egg cell with sperm cells [2]. There are currently a variety of birth control methods or contraceptives including injections, IUD, pills, implants, contraception and condoms [3]. According to the World Health Organization (WHO) in 2012, more than 100 million women use highly effective contraceptives, 75% with hormonal contraception acceptors and 25% use non-hormonal [1].

In Indonesia, hormonal contraception especially injecting is the most widely used method of contraception. One of the most commonly used injection contraceptive methods is DMPA. Depo Medroxy Progesterone Acetate (DMPA) contains 150 mg of depo medroxy progesterone acetate for a period of 3 months of use. The mechanism of DMPA is suppressing ovulation, thicken cervical mucus,
make the endometrium unfavorable for implantation of a fertilized ovum and affect the speed of ovum transport in the fallopian tube [4].

DMPA injection contraception has advantages and disadvantages. The advantages of DMPA contraception are high effectiveness, no effect on the marital relationship and does not interfere with the process of lactation and infant growth and development [5]. The disadvantages of DMPA injection contraception are disruption of menstrual patterns including amenorrhea, menorrhagia and spotting, late return to fertility after stopping use and weight gain [6]. Side effects of hormone progesterone in the reproductive system are cervicitis and in general conditions can cause increased appetite, cause vaginal dryness, decrease libido, whereas in the cardiovascular system can cause increased blood pressure [7]. Women have hormones with the function of preventing blood viscosity and keeping blood vessel walls good. Impaired hormonal balance can occur in the use of hormonal contraceptives. Progesterone can lower HDL-cholesterol levels and elevate LDL-cholesterol levels, resulting in atherosclerosis of high LDL-cholesterol levels in the blood which can cause narrowing of blood vessels and peripheral retention of blood vessels and then affect changes in blood pressure [8], [9].

Hypertension is a disease characterized by an increase in blood pressure above the normal value, which is a systolic value ≥ 140 mmHg and/or diastolic ≥ 90 mmHg [10]. Hypertension can occur in 5% of hormonal contraceptive use. Blood pressure rises gradually and is sedentary. If high blood pressure persists after the use of hormonal contraception is stopped, then there has been a permanent change in blood vessels due to atherosclerosis [5], [11]. Most acceptors begin to experience an increase in blood pressure within 1-5 years of contraceptive use. Blood pressure in the acceptor has increased which varies between 10-40 mmHg, but only a few acceptors have increased to 40 mmHg. Acceptors who use birth control for > 5 years experience an increase in blood pressure up to 20 mmHg [12].

Research results by Isfandari (2015) showed the incidence of women's hypertension in Indonesia can be affected by social determinants of family planning health program policies and limited access to resources that cause emotional distress. The phenomenon of female hypertension which is higher than male at the age of 35 years can be caused by the use of hormonal contraception since a young age accompanied by limited access to resources that increase emotional distress. These social conditions accompanied by major risk factors can contribute to earlier hypertension in women. But this is fine because hypertension can be reduced by various pharmacological actions/therapies such as diuretic drugs, angiotensin, antagonists and non-pharmacological therapies such as low salt diet, meditation, aromatherapy, improving lifestyle. [13], [14]. Furthermore, the purpose of this study was to determine the relationship between DMPA injection contraceptive duration and the incidence of hypertension among mothers in Dukuh Village, Bayat District, Klaten Regency.

2. Method
Type of research used in this study was quantitative with a descriptive correlational design with a cross sectional approach, which is looking for a relationship between the independent variable and the dependent variable. The population in this study were all mothers who used DMPA injection contraception in the Village of Bayat Subdistrict of Bayat as many as 108 people while the sample size in this study was based on the sample size calculation so that it took 52 people to be respondents. The sampling technique in this study used a probability sampling technique with a simple random sampling method to determine the research subjects. Data collection used was demographic data and blood pressure measurements used was a needle sphygmomanometer, the statistical test used was Kendall Tau.

3. Result and Discussion

Table 1. mean age of respondents in Dukuh village Bayat district 2018 (n = 52)

| Variable | Min | Max | Mean | SD   |
|---------|-----|-----|------|------|
| Age     | 22  | 45  | 33.63| 6.107|
Table 1 shows the average age of respondents was 33.63 ± 6.107 years. The youngest age was 22 years old and the oldest was 45 years old. Research by Musdalifah (2013), age is one of factors that determine the use of contraception, the older a person is, the choice of contraception is more on contraception which has a higher effectiveness known as long-term contraception [15]. She argues that respondents aged 20-35 years use contraception more because this age is a productive age. The age range of 20-35 years is the productive age group or in the fertile period and has not yet entered the menopause age so that women of childbearing age have a greater chance of getting pregnant again. In order to avoid pregnancy, one of the decisions they made is to use contraception [16].

Table 2. Frequency distribution of respondents by education in Dukuh village Bayat District year 2018 (n = 52)

| No | Education       | Frequency | %  |
|----|-----------------|-----------|----|
| 1  | Elementary school | 10        | 19.2 |
| 2  | Middle school   | 20        | 38.5 |
| 3  | High school     | 21        | 40.4 |
| 4  | College         | 1         | 1.9  |
|    | Total           | 52        | 100.0 |

Table 2 shows that the majority of respondents were high school educated as many as 21 people (40.4%), the second highest is 38.5% of junior high schools, the third highest was elementary school as many as 19.2 and the least was college as many as 1 person (1.9%). The results of research conducted by Rizali, ikhsan & Salmah (2013) explain other factors that influence the selection of DMPA injection contraception is the level of education, with the higher level of education clearly affecting one's personal opinion, thinking, acting, more independent, and rational in taking decisions and actions, as well as directly influencing a person in knowledge about life orientation including planning [17].

Table 3. Frequency distribution of respondents by occupation in Dukuh village Bayat District 2018 (n = 52)

| No | Occupation   | Frequency | %  |
|----|--------------|-----------|----|
| 1  | Housewife    | 23        | 44.2 |
| 2  | Labor        | 6         | 11.5 |
| 3  | Trader       | 22        | 42.3 |
| 4  | Civil Servant | 1        | 1.9  |
|    | Total        | 52        | 100.0 |

Based on Table 3, it shows that the majority of respondents were housewife as many as 44.2%, the second majority were traders by 42.3%, the fourth were laborers by 11.5% and the lowest was civil servant by 1.9%. Other factors that influence the selection of DMPA injection contraception are occupation, and it is very influential with income, as well as the contraceptive method chosen. Most of the childbearing age in choosing contraception, which is due to practical, effective, and at an affordable price according to their income. Based on the results of the study found that the majority of mothers who used injection contraception were mothers who were not working/housewives. Mothers who work for the private government tend to choose contraceptive methods that have few side effects, and are easy to control. This research is in line with research by Rumende et al (2015), which stated that using contraception certainly requires a number of costs, and low-income groups have greater access to services if the programs were subsidized such as injectable birth control. Injectable hormonal contraception in Indonesia is widely used because of its effectiveness, low price, and safety [18].
Table 4 Frequency distribution of DMPA injection contraception use in Dukuh Village Bayat District in 2018 (n = 52)

| No | Duration of using contraception | Frequency | %   |
|----|---------------------------------|-----------|-----|
| 1  | Long                            | 21        | 40.4|
| 2  | Not Long                        | 31        | 59.6|
|    | Total                           | 52        | 100.0|

Table 4 shows that the long duration of DMPA contraception usage by the respondents (≥ 5 years) were 21 (40.4%) and respondents who used it not that long (<5 years) as many as 31 (59.6%). The duration of contraception is the length of time to use a pregnancy prevention tool (Departemen pendidikan Nasional, 2008). According to Saifuddin (2011) on long-term use can cause vaginal dryness, decreased libido, emotional disturbances, headaches, nervous and acne. In addition, the duration of DMPA injection contraception usage also influences the changes in blood pressure [19]. Sujono (2013) explained that most acceptors begin to experience an increase in blood pressure within 1-5 years of contraceptive use. Blood pressure in the acceptor has increased which varies between 10-40 mmHg, but only a few acceptors have increased to 40 mmHg. Acceptors who use birth control for>5 years experience an increase in blood pressure up to 20 mmHg [20].

Table 4.5 Distribution frequency of respondents’ blood pressure in Dukuh village Bayat District 2018 (n = 52)

| No | Blood pressure | Frequency | %   |
|----|----------------|-----------|-----|
| 1  | Hypertension   | 15        | 28.8|
| 2  | Not Hypertension| 37        | 71.2|
|    | Total          | 52        | 100.0|

Table 5 shows that respondents who experienced hypertension were 15 (28.8%) and respondents who did not have hypertension were 31 (71.2%). It can be known that hypertension is a condition when blood pressure in blood vessels increases chronically. This can occur because the heart is working harder to pump blood to meet the body's oxygen and nutritional needs.[10] The results of Pangaribuhan and Lolong (2013) showed that contraception is a risk factor for hypertension. Hypertension is a disease that arises due to the interaction of various risk factors that a person has. Triggers for hypertension can be divided into 2 factors that can not be controlled such as family history, gender, and age and factors that can be controlled such as obesity, lack of physical activity, smoking behavior, consumption patterns of foods containing sodium and saturated fat [21].

Table 6. The analysis of relationship between the duration of DMPA injection contraception and the incidence of hypertension among mothers in Dukuh Village, Bayat District, Klaten Regency in 2018 (n = 52).

| Duration of use of contraception | Hypertension | No hypertension | Total | P value |
|---------------------------------|--------------|-----------------|-------|---------|
|                                 | F | %  | F | %  | f | %  |
| Not long (<5 years)             | 3 | 20.0 | 28 | 75.7 | 31 | 59.6 | 0.00 |
| Old (≥ 5 years)                 | 12 | 80.0 | 9 | 24.3 | 21 | 40.4 |     |
| Total                           | 15 | 100.0 | 37 | 100.0 | 52 | 100.0 |     |

Table 6 shows that 15 respondents had hypertension where 12 of them had long duration of DMPA injection contraception usage ≥ 5 years and 3 of them with duration <5 years. This result was found to have a significant relationship between the use of DMPA injection contraception with the incidence of hypertension in mothers in Dukuh Village, Bayat Subdistrict, Klaten Regency with a p value of 0.00.
The results of this study are in accordance with research conducted by Sepriandi (2017) which stated that there is a significant relationship between hypertension among fertile women and the length of use of birth control pills [22]. Another study that is in line with this research is Suryanda (2017) with the p value of 0.001, then p.value <0.05. Thus the estimation shows that there is a significant relationship between the use of hormonal contraception to the incidence of secondary hypertension in the Tanjung Agung Health Center, West Baturaja, Ogan Komering Ulu. Women aged 15-49 who use contraception have 1.4 times the risk of developing hypertension compared to those who do not use contraception.[23]

Results of research conducted by Handayani & Yulaikah (2017) DMPA injection contraception containing progesterone causes changes in serum lipids so that there is a decrease in levels of High Density Lipoprotein - cholesterol (HDL-cholesterol) which can increase the risk of increased blood pressure [24].

Women have the hormone estrogen which has the function of preventing blood viscosity and maintaining the walls of blood vessels to keep it good. If there is an imbalance in the hormones estrogen and progesterone in the body, it will be able to affect the level of blood pressure and blood vessel conditions. Impaired hormonal balance can occur in the use of hormonal contraceptives. Hormonal contraception can affect blood pressure, both estrogen and progesterone. Estrogen is one of the hormones that can increase electrolyte retention in the kidneys, resulting in an increase in sodium and water reabsorption which causes hypervolemia and then cardiac output increases and results in increased blood pressure. Progesterone can lower HDL-cholesterol levels and elevate LDL-cholesterol levels, resulting in atherosclerosis of high LDL-cholesterol levels in the blood which can cause narrowing of blood vessels and peripheral retention of blood vessels and then result in increased blood vessels [25], [26].

4. Conclusion
Based on the explanation above, it can be concluded that There is a significant relationship between duration of DMPA injection contraception and the incidence of hypertension.

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Author Contributions
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References
[1] K. RI, Profil Kesehatan Indonesia tahun 2016. Jakarta : Kementrian Kesehatan Repulik Indonesia., 2017.
[2] Suratun, Pelayanan Keluarga Berencana dan Pelayanan Kontrasepsi. Jogjakarta : Trans Info Media, 2008.
[3] BKKBN, Survei demografi dan kesehatan Indonesia 2012: Kesehatan Reproduksi Remaja. Jakarta: BKKBN, 2012.
[4] S. Handayani, Buku Ajar Pelayanan Keluarga Berencana. Yogyakarta: Pustaka Rihama, 2010.
[5] S. L. Millar, “Contraception in women with medical conditions,” Obstet. Gynaecol. Reprod. Med., pp. 1–7, 2019.
[6] M. Mvundura, L. Di Giorgio, C. Morozoff, J. Cover, M. Ndour, and J. K. Drake, “Jo I P,” p. 100012, 2019.
[7] L. A. Olatunji and A. O. Soladoye, “Oral contraceptive-induced high blood pressure is prevented by renin-angiotensin suppression in female rats but not by sympathetic nervous system
[8] Hartanto, *Keluarga Berencana dan kontrasepsi*. Jakarta: Sinar Harapan, 2010.
[9] B. Tendean and R. S. Hamel, “Hubungan Penggunaan Alat Kontrasepsi Suntik Depomedroks Progesteron Asetat ( DMPA ) Dengan Tekanan Darah pada Ibu Di Puskesmas Ranotana Weru,” vol. 5, 2017.
[10] Kemenkes RI, *Profil Kesehatan Indonesia tahun 2014*. Jakarta : Kementrian Kesehatan Repulik Indonesia, 2013.
[11] S. Ramakrishnan et al., “Prevalence of hypertension among Indian adults : Results from the great India blood pressure survey,” no. xxxx, 2019.
[12] H. A. Sujono T, Milawati A, “Pengaruh Pemakaian Kontrasepsi terhadap Peningkatan Tekanan Darah Wanita di Puskesmas Wonogiri,” *J. Farm. Klin. Indones.*, vol. 2, 2013.
[13] E. Triyanto, *Pelayanan Keperawatan bagi Penderita Hipertensi secara Terpadu*. Yogyakarta: Graha Ilmu, 2014.
[14] siti Isfandari, “Penggunaan Kontrasepsi Hormonal dan Distress Emosional Sebagai Kontributor Hipertensi Perempuan Indonesia : Tinjauan Perspektif Jender,” vol. 43, no. 1, pp. 55–62, 2015.
[15] R. Musdalifah, Mukhsen Sarake, “Hormonal Pasutri Di Wilayah Kerja Puskesmas LAMPA Kecamatan Duampanua Kabupaten Pinrang 2013,” pp. 1–13, 2013.
[16] S. D. Rosita, “Faktor-faktoryang Mempengaruhi pemilihan KontrasepsiSuntik Depo Medroksi progesteron Asetat(DMPA) di Rumah BersalinSehaf GentunganNgargoyoso Karanganyar,” 2011.
[17] A. U. Rizali, M.I., Ikhsan, M., Salmah., “Faktor yang Berhubungan dengan Pemilihan Metode Kontrasepsi Suntik di Kelurahan Mantouangin Kecamatan mariso Kota Makassar,” 2013.
[18] W. A. Rumende, I. T., Goenawi, L. R., & Lolo, “Evaluasi Penggunaan Kontrasepsi Suntik pada Pasangan Usia Subur (Pus) Di Kelurahan Walian I Tomohon,” *J. Ilm. Farm.*, vol. 4, 2015.
[19] A. B. Saiffudin, *Buku Panduan Praktis Pelayanan Kontrasepsi*. Jakarta: PT Bina Pustaka Sarwono Prawirohardja, 2010.
[20] A. R. Sujono, T., Milawati, A., Hakim, “Pengaruh Pemakaian Kontrasepsi Terhadap Peningkatan Tekanan Darah Wanita di Puskesmas Wonogiri,” 2013.
[21] L. D. B. Pangaribuan L, “Hubungan Penggunaan Kontrasepsi Pil dengan Kejadian Hipertensi pada Wanita Usia 15-49 Tahun di Indonesia Tahun 2013 (Analisis Data Riskesdas 2013),” pp. 1–8, 2013.
[22] Sepriandi, “Hipertensi pada Wanita Pasangan Usia Subur dengan Lama Penggunaan PIL KB,” vol. 2, 2017.
[23] Suryanda, “Analisis Faktor Resiko Hipertensi Sekunder pada Pengguna Kontrasepsi Aktif di Puskesmas Tanjung Agung,” vol. 6, no. 2, pp. 17–22, 2017.
[24] Handayani R&Yulaikah S, “Perbedaan Tekanan Darah dan Indeks Massa Tubuh pada Akseptor Suntik Kombinasi dan Suntik Depo Medroxyprogesteron Asetat (DPMA),” *J. Kebidanan Dan Kesehat. Tradis.*, vol. 2, pp. 18–29, 2017.
[25] A. D. Craig, J. Steinauer, M. Kuppermann, J. A. Schmittdiel, and C. Dehlendorf, “Pill , patch or ring ? A mixed methods analysis of provider counseling about combined hormonal contraception,” *Contraception*, no. xxxx, 2018.
[26] A. Ti, R. H. Stone, M. Whiteman, and M. Kathryn, “Contraception,” *Pre-proof*, 2019.