

**Original Article**

**OPTIMIZATION OF DRUG SUPPLY OFFICER HEMOGLOBIN LEVELS ON THE IMPROVEMENT OF PREGNANT WOMEN WITH ANDROID BASED ANEMIA**

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**ABSTRACT**

**Objective:** According to WHO, 40% of the maternal mortality rate in developing countries about the incidence of anemia in pregnancy. The incidence of anemia in pregnancy is caused by iron deficiency and acute hemorrhage. The frequency of pregnant women in Indonesia who are anemic are still very high at 63.5% compared to only 6% in the United States [1]. The aim of this research to determine differences in hemoglobin levels before and after supervised by officers to take medication to increase hemoglobin levels in pregnant women with anemia.

**Methods:** The research was quasi-experiment using the control group conducted on July 11, s/d August 15th, 2019. The sample in this study was 30 respondents as the experimental group and 30 respondents as a control group, starting with the measurement of hemoglobin of respondents then monitoring the group given the intervention officer taking medication through an android-based application and subsequently re-measured hemoglobin level. Data were analyzed by univariate and bivariate through t-test with  $\alpha = 0.05$ .

**Results:** The result of the univariate analysis showed the average value of maternal age, parity and gestational age is homogeneous with p-value > 0.05, which means there is no difference in the characteristics of groups of officers taking medication and without officers taking medication, and the bivariate analysis in getting p-value < 0.001 so as to conclude that there are differences in hemoglobin level difference in the group taking medication and the clerk without officers taking medication.

**Conclusion:** The conclusion of this research was hemoglobin levels increased in pregnant women with anemia after supervised by officers to take medication and increasing regularity in consuming Fe tablets in pregnant women.

**Keywords:** Officers taking medication, Hemoglobin level, Anemia

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**INTRODUCTION**

Sawas a characteristic of developing countries is a health issue that is still relatively low. In Indonesia, the low state of health is characterized by a high maternal mortality rate (MMR). Results Indonesian Demographic and Health Survey (IDHS) 2007 national maternal mortality rate is 248 per 100,000 live births, while for central java area is 116 per 100,000 live births.

According to WHO, 40% of the maternal mortality rate in developing countries about the incidence of anemia in pregnancy. The incidence of anemia in pregnancy is caused by iron deficiency and acute hemorrhage. The frequency of pregnant women in Indonesia who are anemic is still very high at 63.5% compared to only 6% in the United States [1-2]. Anemia is a condition in women with hemoglobin (Hb) in the blood of less than 12 g% [3]. While anemia in pregnancy is a condition in women with hemoglobin levels less than or under 11 gr % in the first trimester and third trimester or levels < 10.5 g % in the second trimester.

Some of the factors that can lead to anemia in pregnancy which is gravid, age, parity, education level, economic status and compliance in tablet consumption Fe [4].

Iron needs during pregnancy increases. Some literature says the need for iron doubles of needs before pregnancy. This happens because, during pregnancy, blood volume increased by 50%, so it needs more iron to make hemoglobin. Also, the growth of the fetus and placenta very rapidly also need a lot of iron. In the non-pregnant state, iron needs can usually be met from a healthy and balanced diet. But in a state of pregnancy, the supply of iron from food alone is not sufficient and so we need iron supplement tablets [5].

Based on health research results (Riskasdas) in 2013 prevention incidence of anemia among pregnant women in Indonesia amounted to 37.1%, while the incidence of maternal anemia in Jambi province reached 19.7% of all pregnant women [6].

Based on the background described above, the authors are interested in researching the optimization of the officer taking medicine to increase hemoglobin levels in pregnant women with anemia android based health centers working area intersection wire Jambi city in 2019.

**MATERIALS AND METHODS**

In this study used research method is analytical research by design penelian the research design was quasi-experimental. A quasi-experimental design was an experimental research method by using group control, which aims to determine differences in hemoglobin levels before and after supervised by Official Drinking medicine to increase hemoglobin levels in pregnant women with anemia based on Android. The study population was all pregnant women who are anemic from January to June 2019 in the region of Puskesmas Simpang Jambi City Wire that as many as 134 pregnant women. The sample in this study 30 cases and 30 controls. The sampling technique in this research is conducted with consecutive sampling technique, This research has been conducted on July 11 s/d August 15th, 2019, The data collection is done directly and using android based applications made by officers to take medication against the respondent. Research in univariate analysis to determine the average maternal age, parity and gestational age and bivariate to know differences in hemoglobin levels before and after supervised by Official Drinking medicine to increase hemoglobin levels in pregnant women with anemia based on Android.

**RESULTS AND DISCUSSION**

**Characteristics of respondents**

Based on the research that has been done on 30 respondents as the experimental group and 30 respondents as the control group with the characteristics of respondent's maternal age, parity, and gestational age. The results of the characteristics of respondents are as follows:

**Table 1.1: Characteristics of respondents by age of mother, parity, and gestational age**

| Characteristics of respondents |         | Group      |            | P-value |
|--------------------------------|---------|------------|------------|---------|
|                                |         | X1         | X2         |         |
| Age Mothers                    | mean±SD | 25.9±4.19  | 26.23±3.08 | 0,057 * |
| Parity                         |         | 2.4±0.49   | 2.4±0.49   | 0,509 * |
| Age Pregnancy                  |         | 24.90±5.51 | 23.30±5.81 | 0,606 * |

Ket: X1 = Officers taking medication, X2 = Without officers taking medication, \*) Independent t-test homogeneity is Significant at >0.05 level

On table 1.1 can be interpreted average maternal age, parity, and gestational age is homogeneous with p-value >0.05, which means there is no difference in the characteristics of groups of officers taking medication and without an attendant group to take medication

Table 1.1 based on the characteristics of the respondents, maternal age, parity, and pregnancy can be interpreted that the characteristics of the respondents are homogeneous or similar between the two groups. This means that the two groups did not differ maternal age, parity, and gestational age. The results of the analysis of the characteristics of the age of respondents indicated that the average age of the respondents in the intervention group was 25.9 clerks taking medication. The average age of the respondents in the group without an attendant to medication is 26.2, which means there is no difference in the age of the mother (of childbearing age). According to Potter, *et al.*, mindset and behavior throughout life are always changing with age. The development will greatly affect an individual's emotional health behavior, so emotional maturity and improvement of knowledge with age individuals [7].

Healthy reproductive age ranged between 20-35 y of age. According to Notoatmodjo, age is one indicator of high-risk pregnancies in the range of maternal age <20 y and >35 y at the age of 20-35 y is the most excellent reproduction and has a bit of a risk in pregnancy. The relationship of age with anemia that at age <20 y can lead to anemia because at the age of biological development in this regard is not optimal for reproduction. At such a young age, psychologically immature will cause a pregnant woman is having a nervous breakdown which resulted in a lack of attention to meeting the needs of nutrients during pregnancy. In addition to under 20 y of age, gestational age above 35 y old is also a high-risk age. Women who conceive within USIS too old ie >35 y will also be prone to anemia. It is associated with endurance decrease therefore susceptible to various infections during pregnancy [8-10].

The results of the characteristics of respondents indicated that the average parity in the group given the intervention officer to medication is 2.4. The average value of the parity in the group without attendant intervention to medication is 2.4. Parity is the number of live births which is owned by a woman. Anemia may occur in mothers with high parity associated with the state of the biological mother and the intake of nutrients decreased, hemoglobin level relationships with parity in the Survey of 2005 showed that the prevalence of mild anemia and weight will be higher with increasing parity. The prevalence of mild anemia 1-4 higher than parity 0, ie 70.5%, while the parity<5 prevalence is higher than parity 1-4 is 72.9% and 7.6% for severe anemia in severe anemia 1-4 parity only 3.5% and 2.9% parity 0. The more often a woman experiencing pregnancy and childbirth than the more loss of iron in the body and to be increasing the risk of anemia. Parity>4 is parity at risk of anemia in pregnancy [11].

Parity is one of the important factors that affect the occurrence of iron anemia in pregnant women. According to Manuaba, women who frequently experience pregnancy and childbirth increasingly at risk of anemia due to a lot of iron loss, it is because during pregnancy women use iron storage in the body [12, 13].

The analysis showed that the mean gestational age of 24.9 in the intervention group officers taking medication. The average value of gestational age without the intervention of the officer taking the drug was 23.3. Anemia in pregnant women physiologically occurs due to blood dilution, due to increased blood volume during pregnancy, commonly called viremia or hypervolemia. Pertambah blood cells are less in comparison with the increase of blood plasma dilution to occur. The comparison is as follows plasma (30%), blood cells (18%), and hemoglobin (19%). Increased blood in Pregnancy already ranging from 10 w gestation and culminated in pregnancy between 32 and 36 w [3].

Optimization of the officer taking the drug in increasing hemoglobin levels in pregnant women with anemia based on Android

**Table 1.2: Difference difference Hb levels in groups of officers taking medication and without officers taking medication**

| Group | mean±SD   | Mean difference | 95% CI of difference |       | p-value  |
|-------|-----------|-----------------|----------------------|-------|----------|
|       |           |                 | Lower                | Upper |          |
| X1    | 1.75±0.59 | 1.58            | 1.29                 | 1.86  | <0.001 * |
| X2    | 0.17±0.51 |                 |                      |       |          |

Ket: X1 = Officers taking medication, X2 = Without officers taking medication, \*Independent t-test is significant<005

Based on table 1.2 showed an average increase in Hb of 1.75 was interpreted p-value<0.001 so that it can be concluded that there are differences in Hb levels before and after the intervention by the officer taking the medication. According to WHO in 2000, hemoglobin level indicator of the incidence of anemia among pregnant women is Hb <11 g % [14].

Anemia is a condition of their reduced levels of hemoglobin, hematocrit and red cell count in the blood below normal value, whereas iron deficiency anemia is anemia caused by a lack of iron in the body so that the need for iron (Fe) for erythropoiesis is not sufficiently marked to the image of the cell hypochromic red blood-microtiter, levels of serum iron (serum iron), elevated total iron capacity and reserves of iron in the bone marrow as well as in others very little or nothing at all [15].

According to Purwoastuti, anemia was defined as levels of hematocrit, hemoglobin concentration or red cell count below the

limit of "normal", but normal values are accurate for pregnant women is difficult confirmed for the third laboratory parameters varied during pregnancy. Generally considered anemic pregnant women if hemoglobin levels below 11g/dl according to Rustam, the cause of most of Indonesia's anemia is an iron deficiency that is required for the formation of hemoglobin called iron deficiency anemia. Anemia in pregnant women leads to complications at high risk for miscarriage, bleeding, low birth weight, atonic uterus, uterine inertia, retained placenta [9, 16].

Anemia hazard to the fetus. Although the fetus seemed able to absorb the various needs of the mother, with anemia will reduce the ability of the body's metabolism so that disrupt the growth and development of the fetus in the womb. Anemia can occur due to disturbance such as abortion, intrauterine death, delivery of high prematurity, low birth weight, birth with anemia, congenital defects can occur, your baby gets an infection through perinatal mortality and low intelligence [12].

Anemia can be prevented by maintaining a balance between the needs of the Fe intake and loss. Number Fe is needed to maintain this balance varies between one woman to another, depending on the reproductive history and the amount of blood loss. If the requirements are not met Fe of diet can be coupled with Fe supplements, especially for pregnant women and postnatal [17]. Meanwhile, according to Waryana, prevention of anemia in pregnant women is to always maintain cleanliness, adequate rest, eat nutritious foods and contain Fe, for example, papaya, kale, beef, liver, chicken, and milk [18]

Based on interviews with some respondents said that pregnant women had received iron tablet every time antenatal care visits, both in primary and in the clinic midwife but the fact pregnant women not to consume iron tablet regularly and often forget to take the drug the blood-booster so that it is becoming one the causes of anemia. In this case according to the study conducted by researchers gave the clerk taking medication that serves to monitor pregnant women in consuming Fe tablet to increase hemoglobin levels in pregnant women based on Android, which pregnant women will always be monitored to ensure they regularly consume iron tablet every day.

In the research that has been done on 30 respondents in the experimental group and 30 respondents in the control group obtained the test results independent t-test to determine Optimization of officers to take medication against increased levels of hemoglobin in pregnant women with anemia based on android as prevention of anemia interpreted p-Value 0,084 so it can be concluded that there is no difference in Hb levels before and after taking the drug without attendant intervention by a margin of 0.17.

The role of the officer taking medication intended to facilitated regularity or compliance of pregnant women in consuming Fe tablets in elevated levels of hemoglobin. In this research, the cadres to work as a supervisor in consuming Fe tablet comes with an application based on Android that the officer taking the medication will verification any documentation that pregnant women through the Android every day when consuming Fe tablet or drug blood booster, as a form of regularity or compliance mother pregnant in consuming Fe tablet, the application comes with a notification that an alert notification whenever the mother of neglect or forget to consume iron tablet,

Adherence to consume iron tablets is to obedience pregnant women health workers to implement the recommendation to consume iron tablets. Compliance consumes iron tablets in the measure of the accuracy of the number of tablets consumed, accuracy means taking iron tablets, the frequency of daily consumption. Supplementation of iron or iron tablet administration is one of the major efforts in preventing and combating anemia, particularly iron-deficiency anemia. Iron supplementation is effective because of its iron content which includes folic acid to prevent anemia due to folic acid deficiency [19]. Non-compliance with pregnant women taking iron tablets can have a greater chance of developing anemia. In line with research conducted guidance, shows the results of the statistical test by using the Chi-Square test obtained no association between adherence pregnant women consume iron tablets with anemia in the village Pageraji Cilongok District of Banyumas, with  $p = 0.005$ . That is getting better compliance in consuming Fe tablet mother, the lower the risk of mothers is anemic.

The android-based application is equipped with materials related to the causes of anemia include anemia, anemia effects of both the impact of the mother and the fetus in the womb or after birth, prevention and control of anemia itself. According to Never, 2002 in Wipayani, the factors that influence compliance of pregnant women to consume iron tablets, namely 1) the knowledge that is knowledge of pregnant women about anemia and benefits of iron obtained from the counseling given a midwife at the time pregnant women the ANC's conduct inspection visits. The level of knowledge of mothers also affects the compliance of pregnant women in consuming the substance Fe tablet 2. Education level is a pregnant mother's

educational background also affects the compliance of pregnant women taking iron tablets [20].

In this case, a study was conducted to increase Hb levels as the prevention of anemia and anemia among pregnant women countermeasures. Efforts are being made through the help of volunteers' impact caused devastating for the mother and fetus so that need handling intensive health workers, in this case through the empowerment of officers taking medicine that acts directly as an observer in monitoring pregnant women consume iron tablet include applications based on Android. So with the officer taking medicine can improve compliance android based tablet consumes Fe impacting the decreased incidence of anemia that triggers the maternal and infant mortality.

## CONCLUSION

From the research it can be concluded there is a difference in Hb levels with a  $p\text{-value} < 0.001$  in the group taking the drug better officials compared the group without taking medication officer

## FUNDING

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## AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

## CONFLICT OF INTERESTS

Declare none

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