

**PENGARUH PEMBERIAN TABLET BESI TERHADAP KADAR FERITIN  
SERUM DAN HEMOGLOBIN PADA WANITA PRAHAMIL DENGAN ANEMIA  
DEFISIENSI BESI DERAJAT RINGAN DI BALI**

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**ABSTRAK**

Anemia defisiensi besi (ADB) masih merupakan masalah bagi kesehatan wanita hamil sehubungan dengan prevalensi yang tinggi serta efek yang ditimbulkan. Upaya pencegahan melalui pemberian tablet besi pada wanita saat hamil belum mampu mengatasi masalah ADB pada wanita hamil. Kegagalan ini diduga oleh karena ADB sudah terjadi sejak masa prahamil. Berdasarkan hal tersebut penelitian quasi eksperimental dilaksanakan dengan rancangan *randomized pre and post test control group design*. Sampel diperoleh dengan tehnik *multistage sampling random* terdiri dari 47 kelompok perlakuan dan 52 kelompok kontrol. Pada kedua kelompok dilakukan pemeriksaan kadar feritin serum dan hemoglobin sebanyak tiga kali yaitu pada masa prahamil, awal hamil dan saat hamil. Selanjutnya pada kelompok perlakuan diberikan tablet besi sejak masa prahamil dan dilanjutkan selama 3 bulan pada masa hamil, sedangkan kelompok kontrol tablet besi diberikan sejak masa hamil. Hasil uji dengan *t-group* menunjukkan bahwa rerata kadar feritin serum dan hemoglobin pada wanita hamil lebih besar pada kelompok perlakuan yaitu  $33,45 \pm 14,12$   $\mu\text{g/dL}$  dan  $12,25 \pm 1,20$   $\text{g/dl}$  dibandingkan dengan kelompok kontrol yaitu  $19,65 \pm 8,99$   $\mu\text{g/dL}$  dan  $10,91 \pm 0,67$   $\text{g/dl}$  ( $p < 0,05$ ). Beda rerata kadar feritin serum dan hemoglobin pada saat hamil adalah  $13,8$   $\mu\text{g/dL}$  dan  $1,34$   $\text{g/dl}$  ( $p < 0,05$ ). Hasil analisis manfaat menunjukkan bahwa pemberian tablet besi yang dimulai pada masa prahamil lebih bermanfaat ( $BCR > 1$ ) dibandingkan dengan pemberian saat hamil. Berdasarkan hasil penelitian ini maka dapat disimpulkan bahwa pemberian tablet besi pada wanita dengan ADB yang dimulai saat masa prahamil memberikan pengaruh lebih besar dibandingkan dengan saat masa hamil.

Kata kunci: anemia, prahamil, tablet besi

**EFFECT OF ORAL IRON TABLET ADMINISTRATION ON SERUM FERITIN  
AND HEMOGLOBIN CONCENTRATION OF PRE-PREGNANT WOMEN WITH  
MILD IRON DEFICIENCY ANEMIA IN BALI**

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**ABSTRACT**

Iron deficiency anemia (IDA) is still to be a problem of pregnant women health related to its high prevalence and its negative effects on health. Prevention efforts by iron supplementation in pregnant woman have not reducing IDA problem in pregnant women yet.

This failure is probably due to the assumption that IDA have been seen pre-pregnant. To test this hypothesis, a quasi experimental study was conducted by randomized pre and post test control group design. Sample were collected by multistage sampling random technic consist of 47 women in treated group and 52 in control group. Both group were serum ferritin and hemoglobin value test untill 3 time, pre-pregnant, early pregnant and during pregnant. Iron tablet was administrated to treated group from the beginning of pre-pregnant period, continued until the first 3 months of pregnancy, while in control group iron tablet was only given during the first 3 months of pregnancy. T-group result shown that mean serum ferritin and hemoglobin concentration at pregnant women on treated group ( $33,45 \pm 14,12 \mu\text{g/dL}$  dan  $12,25 \pm 1,20 \text{ g/dl}$ ) more high than control group ( $19,65 \pm 8,99 \mu\text{g/dL}$  dan  $10,91 \pm 0,67 \text{ g/dl}$ ),  $p < 0,05$ . Mean difference serum ferritin and hemoglobin concentration at pregnant women is  $13,8 \mu\text{g/dL}$  dan  $1,34 \text{ g/dl}$  ( $p < 0,05$ ). Benefid analysis result shown that iron supplementation since pre-pregnant more benefid than iron supplementation during pregnant ( $BCR > 1$ ). Based on these results, it can be concluded that iron supplementation to IDA women starting from pre-pregnant period results in a better effect compare to oral iron supplementation during pregnancy only.

Keywords: anemia, pre-pregnant, iron supplementation

## LATAR BELAKANG MASALAH

Anemia defisiensi besi (ADB) masih merupakan masalah kesehatan wanita hamil oleh karena prevalensinya yang tinggi dan dampak yang ditimbulkan. Berbagai negara termasuk negara Indonesia melaporkan angka prevalensi ADB pada wanita hamil tetap tinggi, meskipun bervariasi lebar. Dimulai dari yang paling rendah adalah prevalensi ADB pada kehamilan di negara maju yaitu rata-rata 18%<sup>3</sup> sedangkan prevalensi rata-rata anemia pada wanita hamil di Indonesia sekitar 63,5%.<sup>7</sup> Di Bali, angka prevalensi ADB pada wanita hamil dilaporkan sebesar 46,2%.<sup>8</sup> Dampak yang ditimbulkan antara lain partus prematurus, berat badan lahir rendah, penurunan status imun, kemungkinan gangguan fisiologis dan tumbuh kembang bayi<sup>1</sup>. Secara ekonomis dampak ADB pada kehamilan dapat dihitung berdasarkan perkiraan biaya yang harus dikeluarkan bila terkena dampak ADB pada kehamilan.

Upaya penanggulangan ADB telah dilakukan oleh pemerintah melalui program pemberian tablet besi pada wanita hamil, namun upaya tersebut belum memberikan hasil yang memuaskan. Salah satu dugaan penyebab kegagalan pemberian tablet besi pada saat wanita sedang hamil adalah ketersediaan cadangan besi tubuh.<sup>4</sup> Dalam keadaan hamil seorang wanita membutuhkan 1000 mg besi selama kehamilannya. Apabila kebutuhan

tersebut tidak dapat terpenuhi melalui diet harian, maka akan terjadi mobilisasi cadangan besi tubuh.<sup>5</sup> Oleh karena itu, seorang wanita seharusnya memiliki cadangan besi tubuh yang mencukupi kebutuhan selama kehamilan. Namun yang terjadi adalah sebaliknya, di mana sebagian besar wanita hamil memiliki cadangan besi tubuh yang rendah bahkan kosong. Hal ini disebabkan karena wanita-wanita di negara berkembang sering mengalami defisiensi besi laten sejak masa prahamil. Kadar cadangan besi tubuh akan semakin menurun bila wanita ini mengalami kehamilan oleh karena kebutuhan besi meningkat selama hamil.

Berdasarkan uraian tersebut, maka penelitian ini dilaksanakan untuk mengetahui perbedaan pengaruh pemberian tablet besi yang dimulai saat prahamil dibandingkan dengan pemberian tablet besi yang dimulai saat awal hamil.

#### **BAHAN DAN CARA KERJA**

Penelitian *quasi eksperimental* ini dilaksanakan di Kecamatan Abiansemal Kabupaten Badung pada bulan Mei 2006 - Januari 2007. Rancangan yang digunakan adalah *randomised pre and post test control group design*. Sampel diperoleh dengan cara *multistage sample random* terdiri atas 52 kelompok kontrol dan 47 kelompok perlakuan. Pada kedua kelompok dilakukan pemeriksaan kadar feritin serum dan hemoglobin sebanyak 3 kali yaitu pada masa prahamil, awal hamil dan saat hamil. Selanjutnya pada kelompok perlakuan diberikan tablet besi sejak masa prahamil hingga 3 bulan pertama umur kehamilan, sedangkan pada kelompok kontrol tablet besi diberikan mulai masa hamil. Data hasil pengukuran dianalisis dengan uji *t-group* dan *BCR*.

#### **HASIL DAN PEMBAHASAN**

Hasil intervensi menunjukkan adanya penurunan jumlah ADB lebih besar pada kelompok perlakuan dibandingkan dengan kelompok kontrol. Perubahan juga terlihat pada rerata kadar feritin serum dan hemoglobin yaitu lebih besar pada kelompok perlakuan dibandingkan dengan kelompok kontrol. Perubahan rerata ini dinyatakan bermakna berdasarkan nilai  $p < 0,05$  seperti terlihat pada tabel 1.

Tabel 1. Distribusi rerata kadar feritin serum dan hemoglobin pada wanita dengan ADB menurut kelompok perlakuan dan kelompok kontrol

| Variabel           | Kelompok Perlakuan<br>(N=47) |       | Kelompok Kontrol<br>(N=52) |      | t     | p     |
|--------------------|------------------------------|-------|----------------------------|------|-------|-------|
|                    | Rerata                       | SD    | Rerata                     | SD   |       |       |
| Feritin Prahamil   | 14,95                        | 4,21  | 13,94                      | 4,18 | 1,193 | 0,230 |
| Hb Prahamil        | 10,26                        | 0,66  | 10,19                      | 0,63 | 0,477 | 0,060 |
| Feritin Awal Hamil | 25,68                        | 9,00  | 13,32                      | 4,25 | 9,088 | 0,000 |
| Hb Awal Hamil      | 11,52                        | 1,05  | 10,23                      | 0,55 | 7,515 | 0,000 |
| Feritin Saat Hamil | 33,45                        | 14,12 | 19,65                      | 8,99 | 5,413 | 0,000 |
| Hb Saat Hamil      | 12,25                        | 1,20  | 10,91                      | 0,67 | 6,462 | 0,000 |

SD = Standar Deviasi

Beda rerata kadar feritin serum dan hemoglobin ditunjukkan pada tabel 2 dimana beda rerata kadar feritin serum dan hemoglobin lebih besar pada kelompok perlakuan dibandingkan dengan kelompok kontrol ( $p < 0,05$ ).

Tabel 2. Beda rerata kadar feritin serum dan hemoglobin wanita dengan ADB derajat ringan antara kelompok perlakuan dan kelompok kontrol

| Variabel           | Kelompok Perlakuan<br>(n=47) |       | Kelompok Kontrol<br>(n=52) |      | Beda rerata | t     | p     |
|--------------------|------------------------------|-------|----------------------------|------|-------------|-------|-------|
|                    | Rerata                       | SD    | Rerata                     | SD   |             |       |       |
| Feritin Prahamil   | 14,95                        | 4,21  | 13,94                      | 4,18 | 1,01        | 1,193 | 0,230 |
| Feritin Awal Hamil | 25,68                        | 9,00  | 13,32                      | 4,25 | 12,36       | 9,088 | 0,000 |
| Feritin Saat Hamil | 33,45                        | 14,12 | 19,65                      | 8,99 | 13,8        | 5,413 | 0,000 |
| Hb Prahamil        | 10,26                        | 0,66  | 10,19                      | 0,63 | 0,07        | 0,477 | 0,060 |
| Hb Awal Hamil      | 11,52                        | 1,05  | 10,23                      | 0,55 | 1,29        | 7,515 | 0,000 |
| Hb Saat Hamil      | 12,25                        | 1,20  | 10,91                      | 0,67 | 1,34        | 6,462 | 0,000 |

SD = Standar Deviasi

Pemberian tablet besi mampu mengatasi defisiensi besi lebih cepat pada wanita yang mendapatkan tablet besi sejak masa prahamil dibandingkan dengan yang mendapatkan tablet besi mulai saat hamil. Hal ini dapat dijelaskan oleh karena populasi wanita di negara berkembang sering mengalami defisiensi besi laten sehubungan dengan asupan besi diet yang tidak mencukupi kebutuhan besi tubuh.<sup>2</sup> Kandungan besi diet perhari rata-rata 12-19 mg besi perhari dan yang mampu diserap hanya sebesar 1-7%. Sedangkan kebutuhan besi perhari pada wanita prahamil adalah 1-2 mg besi dan wanita hamil adalah 3-4 mg. Dengan demikian pemberian tablet besi dibutuhkan untuk memenuhi cadangan besi tubuh. Respon

terapi berupa peningkatan kadar hemoglobin dapat terlihat pada hari ke-7 sedangkan untuk peningkatan kadar feritin serum membutuhkan waktu lebih lama. Pemberian tablet besi sebesar 200 mg perhari diperkirakan mampu diserap sekitar 18% dengan efek samping yang ada dapat ditoleransi. Pada penelitian ini, efek samping pemberian tablet besi terdiri atas mual, perut kembung dan sulit buang air besar (BAB) tidak mempengaruhi kejadian ADB pada wanita prahamil. Begitu pula dengan kepatuhan subyek mengkonsumsi tablet besi. Berdasarkan hasil uji *Chi-Square*, perbedaan efek samping yang ada serta kepatuhan subyek dinyatakan berbeda tidak bermakna ( $p>0,05$ ).

Manfaat pemberian tablet besi diukur berdasarkan nilai *benefit cost ratio* (BCR) di mana program ini bermanfaat bila nilai BCR  $> 1$ .<sup>6</sup> Secara ekonomis pemberian tablet besi menimbulkan biaya risiko penyakit di mana besarnya biaya dihitung berdasarkan besarnya biaya penyakit BBLR, prematuritas dan abortus di Rumah Sakit. Berdasarkan besarnya biaya penyakit dapat dirinci besarnya manfaat pemberian tablet besi. Selanjutnya, nilai BCR dapat ditentukan dengan membandingkan besarnya manfaat dengan biaya pemberian tablet besi seperti pada tabel 3.

Tabel 3. Rasio manfaat terhadap biaya (BCR) pemberian tablet besi pada kelompok perlakuan dan kelompok kontrol

| Risiko       | BCR       |         |
|--------------|-----------|---------|
|              | Perlakuan | Kontrol |
| BBLR         | 7,4       | 3,2     |
| Prematuritas | 14,6      | 9,3     |
| Abortus      | 16,3      | 10,2    |

Berdasarkan uraian di atas, pencegahan ADB pada kehamilan dimungkinkan melalui penyediaan cadangan besi tubuh sebelum hamil.

## SIMPULAN

Pemberian tablet besi pada wanita masa prahamil lebih efektif dan bermanfaat dibandingkan dengan pemberian tablet besi yang dimulai pada masa hamil. Adanya efek samping pemberian tablet besi dapat ditoleransi pada kedua kelompok serta biaya yang relatif murah menyebabkan pemberian tablet besi ini menjadi *feasible* untuk dilaksanakan.

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THE EFFECT OF ORAL IRON TABLET SUPPLEMENTATION ON SERUM

## **FERITIN AND HEMOGLOBIN CONCENTRATION OF PRE-PREGNANT WOMEN WITH MILD IRON DEFICIENCY ANEMIA IN BALI**

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### **ABSTRACT**

Iron deficiency anemia still becomes a problem to pregnant women due to its high prevalence and its negative effects on health. Prevention efforts by iron supplementation for pregnant women hasn't succeeded in reducing IDA problem in pregnant women yet. This failure is probably due to the assumption that IDA has occurred since pre-pregnant. To test this hypothesis, a quasi experimental study was conducted by randomized pre and post test control group design. Sample were collected using multistage sampling random technique consisting of 47 women in treated group and 52 in control group. A serum ferritin and hemoglobin value test was conducted until 3 times to both groups, pre-pregnant, early pregnant and during pregnancy. Iron tablet was administrated to treated group from the beginning of pre-pregnant period, continued until the first 3 months of pregnancy, while in control group iron tablet was only given during the first 3 months of pregnancy. T-group result shown that mean serum ferritin and hemoglobin concentration at pregnant women on treated group ( $33,45 \pm 14,12 \mu\text{g/dL}$  dan  $12,25 \pm 1,20 \text{ g/dl}$ ) more high than control group ( $19,65 \pm 8,99 \mu\text{g/dL}$  dan  $10,91 \pm 0,67 \text{ g/dl}$ ),  $p < 0,05$ . Mean difference of serum ferritin and hemoglobin concentration at pregnant women is  $13,8 \mu\text{g/dL}$  and  $1,34 \text{ g/dl}$  ( $p < 0,05$ ). Benefit analysis result showed that iron supplementation since pre-pregnant is more beneficial than iron supplementation during pregnancy ( $BCR > 1$ ). Based on these results, it can be concluded that iron supplementation to IDA women starting from pre-pregnant period results in a better effect compared to oral iron supplementation during pregnancy only.

Keywords: anemia, pre-pregnant, iron supplementation

### **INTRODUCTION**

Iron deficiency anemia (IDA) still becomes a pregnant woman health problem related to high prevalence and effect produced. Many countries including Indonesia reported the prevalence of IDA in pregnancy remain high, nonetheless within a wide range. The lowest prevalence is found in developed countries, 18% meanwhile the prevalence of IDA on pregnancy in Indonesia is 63,5%.<sup>1</sup> Prevalence of IDA in pregnancy reported 46,2% in Bali.<sup>22</sup> The effect of IDA is prematurity labour, low weight birth, decrease of immune status, physiological and baby growth-development disorders<sup>1</sup>. Economically, the effect of

IDA on pregnancy can be estimated from the cost of expenditure when pregnancy with IDA.

Attempts to manage the IDA have been done through a government's program of administrating the iron tablet on pregnancy. But the results were unsatisfied yet. The failure was due to the iron storage problem<sup>4</sup>. Women need 1000 mg Fe during pregnancy, and if it cannot be fulfilled through daily intake, Fe mobilization from iron storage is promoted.<sup>11</sup> Therefore, a woman should have an adequate iron storage during pregnancy. But the fact is that women have minimal or empty iron storage. It is caused by the fact that women often suffer from latent Fe deficiency since pre-pregnancy period in developing countries. The iron storage decreases when they are pregnant because of the increasing Fe needs. Based on the above explanations, the study is aimed at knowing the different effects of iron tablet supplementation which is administrated during pre-pregnancy period compared to being administrated during pregnancy on women with iron deficiency anemia.

## **MATERIALS AND METHODS**

This quasi experimental study was carried out at Abiansemaldistrict, Badung Regency from May 2006 to January 2007. The research design used was randomized pre and post test control group design. Samples were collected by multistage sample random consisting of 52 control group and 47 cases group. Two groups were checked for serum ferritin and hemoglobin concentration three times covering pre-pregnancy, early of pregnancy and during pregnancy. The case groups were given oral iron tablet since pre-pregnancy period until first 3 month of pregnancy, meanwhile on control group, oral iron tablet was given since pregnancy period. The measurement result data was analyzed using t-group and BCR .

## **RESULTS AND DISSCUSION**

Result of intervention showed a decrease of IDA case groups more than control groups. The differences were also seen on mean of serum ferritin and hemoglobin



concentration, that the treated group more than control group. The mean was significant based on p value < 0,05 as shown by table 1.

Table 1. Mean distribution of ferritin serum and hemoglobin concentration in women with IDA in case and control groups

| Variable                | Case groups<br>(N=47) |       | Control groups<br>(N=52) |      | t     | p     |
|-------------------------|-----------------------|-------|--------------------------|------|-------|-------|
|                         | Mean                  | SD    | Mean                     | SD   |       |       |
| Feritin pre-pregnancy   | 14,95                 | 4,21  | 13,94                    | 4,18 | 1,193 | 0,230 |
| Hb pre-pregnancy        | 10,26                 | 0,66  | 10,19                    | 0,63 | 0,477 | 0,060 |
| Feritin early pregnancy | 25,68                 | 9,00  | 13,32                    | 4,25 | 9,088 | 0,000 |
| Hb early pregnancy      | 11,52                 | 1,05  | 10,23                    | 0,55 | 7,515 | 0,000 |
| Feritin on pregnancy    | 33,45                 | 14,12 | 19,65                    | 8,99 | 5,413 | 0,000 |
| Hb on pregnancy         | 12,25                 | 1,20  | 10,91                    | 0,67 | 6,462 | 0,000 |

SD = standard deviation

Mean difference of serum ferritin concentration and hemoglobin in table 2 showed that the mean differences on treated group was higher than control group (p<0,05).

Table 2. Mean difference of serum ferritin and hemoglobin concentration in women with mild IDA between two groups

| Variable                | Case groups<br>(n=47) |       | Control groups<br>(n=52) |      | Mean diff | t     | p     |
|-------------------------|-----------------------|-------|--------------------------|------|-----------|-------|-------|
|                         | Mean                  | SD    | Mean                     | SD   |           |       |       |
| Feritin pre-pregnancy   | 14,95                 | 4,21  | 13,94                    | 4,18 | 1,01      | 1,193 | 0,230 |
| Feritin early pregnancy | 25,68                 | 9,00  | 13,32                    | 4,25 | 12,36     | 9,088 | 0,000 |
| Feritin on pregnancy    | 33,45                 | 14,12 | 19,65                    | 8,99 | 13,8      | 5,413 | 0,000 |
| Hb pre-pregnancy        | 10,26                 | 0,66  | 10,19                    | 0,63 | 0,07      | 0,477 | 0,060 |
| Hb early pregnancy      | 11,52                 | 1,05  | 10,23                    | 0,55 | 1,29      | 7,515 | 0,000 |
| Hb on pregnancy         | 12,25                 | 1,20  | 10,91                    | 0,67 | 1,34      | 6,462 | 0,000 |

SD = Standard Deviasi

Supplementation of iron tablet could overcome iron deficiency quicker on women who were given iron tablet since pre-pregnancy compared to those given iron tablet during pregnancy. The reason is that women population in developing countries often suffer from latent iron deficiency due to insufficient iron diet intake to fulfill body iron stores.<sup>2</sup> The

mean of daily iron diet content is 12-19 mg iron per day but only 1-7% are absorbed. Iron needed per day on pre-pregnant women is 1-2 mg iron and on pregnant women is 3-4 mg. Iron supplementation were needed to fulfill body iron stores. Therapy response by increasing hemoglobin concentration could be seen on day 7 and to increase serum ferritin concentration needed more time. Iron supplementation, 200 mg per day is estimated to be absorbed about 18% with a tolerable side effect. In this research, side effect of iron supplementation consists of burning sensation on chest, nausea, vomiting, diarrhea, and constipation, did not affect IDA rate on pre-pregnant women. The same happened to subject compliance to consume iron tablet. Based on Chi-Square test, the difference of side effect and subject compliance was not significant ( $p>0,05$ ).

The iron tablet administration measured by benefit cost ratio (BCR) indicated that this program is useful if BCR value  $> 1$ .<sup>6</sup> Economically, administration iron tablet resulted in the cost of disease calculated from the cost of disease such as low birth weight, prematurity and abortion at hospital. Based on the cost, the benefit of administration iron tablet could be measured. And then, BCR could be measured by comparing how significant the benefit compared to the cost of iron supplementation as shown in table 3.

Table 3. Cost- Benefit Ratio of iron tablet administration in case and control groups.

| Risk             | BCR   |         |
|------------------|-------|---------|
|                  | cases | control |
| Low Birth Weight | 7.4   | 3.2     |
| Prematurity      | 14.6  | 9.3     |
| Abortion         | 16.3  | 10.2    |

Based on the above explanation, prevention of IDA on pregnancies can be done by providing body iron stores since pre-pregnant.

## CONCLUSION AND SUGGESTION

Iron supplementation on pre-pregnant women is more effective and beneficial than iron supplementation during pregnancy. The existence of side effect can be tolerated on both groups, and the cheap supplementation cost made this iron supplementation feasible to be done.

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