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Description Of Giving Blood Supplement Tablets To Donor Haemoglobin Levels in PMI Banyumas Regency

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Abstract

Background: Based on data from the Banyumas Regency PMI for August 2023, it is stated that there are 182 requests for blood products every day, but the Banyumas Regency PMI can only fulfil the demand for blood products at 152 blood bags/day, which means that in one day, the Banyumas Regency PMI still lacks 30 blood bags. Everyday. Therefore, this is the background for UDD PMI Kab. Banyumas to provide additional blood supplements of Fe 60 mg and Folic Acid 0.4 mg to donors who failed due to low haemoglobin levels, namely < 12.5 gr/dL. Giving blood supplement tablets is considered to be able to increase haemoglobin levels more quickly than other vitamin supplements because they contain iron (Fe). The purpose of this study was to determine the increase in haemoglobin levels before and after giving blood supplements to blood donors in UDD PMI Banyumas.
Method: This quantitative research uses an analytical observational method (Cross-Sectional Study), with a Purposive sampling technique using the Slovin Formula, resulting in 24 samples. Of the 24 prospective blood donors who failed the HB screening selection, they were given treatment with blood supplements of 5 tablets, which were consumed once a day.
Result: The average result of checking the haemoglobin level before administering the blood supplement was 11.48 gr/dL. After taking the blood supplement, the donor rechecked the haemoglobin level, and the average haemoglobin level was 12.57 gr/dL. Based on the results of pre- and post-blood supplement examinations, the results showed an average increase in haemoglobin levels of 1.09 gr/dL.
Conclusion: Prospective blood donors who consumed blood supplement tablets, namely Fe 12.45 mg and Folic Acid 0.5 mg, one tablet per day for 5 days, experienced an average increase in haemoglobin levels of 1.09 gr/dL.

Keywords: blood supplements, haemoglobin, prospective blood donors

1. INTRODUCTION

Blood donation is the process of taking blood from someone voluntarily to be stored in a blood bank that is used for blood transfusion purposes. Whole blood, also known as complete blood, is a blood product obtained directly without the separation of blood components from blood collection at the time of blood donation. Packed Red Cell (PRC) is a blood component obtained from the separation of whole blood (WB). Packed Red Cell contains red blood cells, leucocytes, platelets and a small amount of plasma. One unit of PRC with a volume of 150-300 mL contains red blood cells around 100-200 mL, which can increase haemoglobin levels up to 1 gr/dL within 6 hours. Therefore, the fulfilment of blood products, especially Whole Blood products, is highly sought after for transfusion purposes. The purpose of giving blood transfusions is to increase the volume of

blood circulation after surgery, increase the number of red blood cells and maintain haemoglobin levels in the blood, and provide cellular components in accordance with the therapy needed (1,19).

In the Annual Report of the Blood Services Section of the Banyumas District Indonesian Red Cross Blood Donor Unit in 2023, in August 2023, there were 8,451 prospective blood donors from in-building blood donation activities and Mobile Units conducting blood donor selection, and as many as 2,678 prospective donors were rejected at the donor selection stage, because they did not meet the specified requirements.

Based on a statement from Sadewo Tri Lastiono as the Chairperson of the Banyumas Regency PMI for the 2021-2026 service period, stating that every day the Banyumas Regency PMI needs 182 bags of blood/day, but can only meet the demand for 152 bags of blood/day, which means that in one day the Banyumas Regency PMI still lacks 30 bags of blood every day, this happened because of the high demand for blood stocks from hospitals to fulfill blood supplies for patients. This is why PMI Banyumas provides blood supplements, Fe 12.45 mg and folic acid 0.5 mg, to failed donors due to low haemoglobin levels.

PMI Banyumas has long used blood supplement tablets in an effort to increase the haemoglobin levels of prospective donors. Blood supplement tablets are iron supplements containing 60 mg of elemental iron and 0.25 mg of folic acid (as recommended by WHO). Still, in an effort to increase haemoglobin levels in failed donors, blood supplement tablets containing 12.45 mg of Fe and 0.5 mg of folic acid are used (2,16). Blood supplements are food supplements containing iron and folate that play an essential role in the formation of red blood cells that transport oxygen from the lungs to the tissues (3,21).

Based on the statement, the increase in haemoglobin levels can reach 1 gr/dL - 2 gr/dL within 4-6 weeks (4,22). As well as in the research of haemoglobin levels of anaemic pregnant women, it was mentioned that the increase in haemoglobin levels can reach 0.1-0.2 gr/dL in one week (5).

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2. MATERIALS AND METHODS

This study uses descriptive analysis taken from data on failed prospective donors at the UDD PMI Banyumas Regency, namely the period 15-28 January 2024. This quantitative research uses analytical observational methods (Cross-Sectional Study), with purposive sampling techniques using the Slovin Formula, resulting in 24 samples. Of the 24 prospective blood donors who failed the HB examination, selection was given the treatment of providing blood supplements, up to 5 tablets consumed 1x1 a day. Inclusion criteria are taken from donors who fail because hemoglobin is below 12.5 gr/dL, have passed the blood donor selection by the selection doctor, and have normal blood pressure, namely diastole 60-90 mm/Hg and systole 100-130 mm/Hg, and the exclusion criteria taken are donors who fail the selection process with the doctor in charge and prospective donors who have hemoglobin between 12.5-17 gr/dL. After the 5th day of administration of blood supplement tablets, a post-administration examination of blood supplement tablets was conducted. The post-administration examination of blood tablets is carried out on days 5 to 7 after the prospective donor consumes routine blood supplements every day. The examination was carried out using the HBMeter POCT.

3. RESULTS

a. Sample Characteristics

The characteristics of the samples taken in the study "Description Of Giving Blood Supplement Tablets To Donor Haemoglobin Levels In PMI Banyumas Regency" include gender (W/M), the range of donor return period between day 5 and day 7, the initial haemoglobin level before being given the treatment of giving blood-

added tablets, and haemoglobin levels after giving blood-added tablets. The following is the sample characteristics data.

Table 1. Sample Characteristics

	Characteristics	f	N	%
Gender	Women	18	24	75
	Male	6		25
Return time range	<5 days	0	24	0
	≥ 5 day	24		100
Baseline haemoglobin level	< 12,5 gr/dL	0	24	0
	≥ 12,5 gr/dL	24		100
Final haemoglobin level	< 12,5 gr/dL	14	24	58,3
	≥ 12,5 gr/dL	7		41,7
TOTAL				100

Sample Characteristics, shows from the number of donors who failed blood donor selection due to low haemoglobin levels dominated by women with the number of failed donors 75% and men as much as 25%, where the pre and post examination time span is categorised into two, namely donors returning before 5 days of giving blood supplement tablets and donors returning after 5 days of running the treatment of consumption of blood supplement tablets.

Based on the data obtained, all donors who did the initial screening had haemoglobin levels < 12.5 gr/dL, so they could not donate blood. After the treatment of giving blood supplement tablets, the results showed an increase in the number of donors, with as many as seven people passing, and 14 prospective donors could not donate blood.

b. Haemoglobin Level Pre and Post Treatment of Blood Addition Tablet Consumption

The study of haemoglobin levels before and after the blood tablet supplementation treatment was conducted by taking 24 samples of failed donor candidates during the initial haemoglobin screening. Prospective failed donors were directed to recheck within 5-7 days of the initial screening. Data were obtained in the form of gender (W/M), initial haemoglobin levels before being given blood supplement tablets, haemoglobin levels after being given blood supplement tablets, and the obtained delta haemoglobin levels pre- and post-blood supplement tablets consumption treatment. The following are the results of haemoglobin levels of donors pre- and post-blood supplementation.

Table 2. Comparison of Upper and Lower Limit HB Values Pre and Post TTD

Treatment Group (n=24)		Haemoglobin value (gr/dL)	Delta	Mean	MD
Pre-Suplement TD	↓	10,4 gr/dL	2.4	11.47 gr/dL	
	↑	12,4 gr/dL			

Post-Supplement TD	↓	11,1 gr/dL	3.5	12.75 gr/dL	1.28 gr/dL
	↑	14,3 gr/dL			

Note: ↑ (upper haemoglobin level) ↓ (lower haemoglobin level)

Based on Table 2 Comparison of Upper and Lower Limit Hb Values Pre and Post Supplementation, the lowest haemoglobin level from the pre blood tablet supplementation examination is 10.4 gr/dL, and the highest haemoglobin level from the post blood tablet supplementation examination is 14.3 gr/dL, which is the haemoglobin level of female donor candidates. The mode of the haemoglobin level post blood tablet supplementation was 12.4 g/dL and 12.8 g/dL, and the mean of the haemoglobin level was 12.2 g/dL. From all the data on haemoglobin levels of prospective donors before giving blood supplement tablets, the average haemoglobin level was obtained at 11.48 gr/dL. The lowest haemoglobin level of prospective donors was 11.1 gr/dL and the highest haemoglobin level was 14.3 gr/dL, resulting in an average haemoglobin level of 12.57 gr/dL.

Table 3. Frequency of Change in Haemoglobin Level Post TTD Consumption

HB Post Supplement	f	%
Hb Up (↑)	23	95,8
Fixed HB	1	4,2
Hb Down (↓)	0	0
TOTAL	24	100

Frequency of Changes in Haemoglobin Levels Post TTD Consumption states that of the 24 prospective blood donors who were treated with blood supplement tablet consumption, 23 prospective donors experienced an increase in haemoglobin levels, and one prospective donor did not experience changes in haemoglobin levels after post-treatment examination of blood supplement tablet consumption.

4. DISCUSSION

a. Initial Haemoglobin Level of Donors Pre-Given Blood Addition Tablets

The results of the initial haemoglobin level study before administering the blood tablet treatment, based on a total of 24 potential donors, showed that none of them met the haemoglobin level requirement of < 12.5 g/dl> to be eligible to donate blood. Among these donors, five females had haemoglobin levels above the anaemia threshold, while 13 had levels indicating anaemia; additionally, six males were classified as anaemic. This classification is based on the standard criteria, which define normal haemoglobin levels as≥12.0 g/dl for women and≥13.0 g/dl for men (7,15).

A total of 24 samples were taken in this study, and it was found that the number of female donors failed more in the initial selection of haemoglobin levels. The influence of menstruation in women is one of the main factors why women's haemoglobin levels tend to be lower than men's (21,22,23). The intake of healthy food into the body must work optimally to replace the heme levels in the blood that come out during menstruation. Therefore, women's haemoglobin levels will tend to be lower than men's, even though the food intake is equally balanced (8,18).

The haemoglobin levels of donors who did the initial screening were all unable to donate blood because the haemoglobin level was <12.5gr/dL. Some of the factors that cause donors to be constrained in the initial screening of haemoglobin examination are due to tired body conditions, lack of food intake rich in iron and protein, and menstruation experienced by female donors a few days before the haemoglobin level check (9,20) in the research, which states that factors that can trigger anaemia include nutritional status, Fe tablet consumption, duration of menstruation, food intake, infection, lack of red blood cell production, knowledge, and economy (10,24).

The body needs time to produce sufficient heme levels, so prospective donors who plan to donate their blood must prepare their bodies several days in advance of the health screening. Prospective donors at UDD PMI Banyumas Regency are expected to maintain their body condition 5-7 days before the examination (11).

b. Haemoglobin Levels Post Administration of Blood Addition Tablets

The results of the study on haemoglobin levels after administering blood supplement tablets showed that 24 donors who had been given blood supplement tablets returned within 5-7 days from the start of the examination, having completely consumed the blood supplement tablets. Fourteen potential donors returned on day 5, 7 potential donors returned on day 6 and 3 potential donors returned on day 7. Of all the potential donors, 23 had increased haemoglobin levels and 1 had no change in haemoglobin levels.

The average haemoglobin level of prospective donors who checked their haemoglobin levels on day 5 was 12.49 g/dL, on day 6 was 12.62 g/dL, and on day 7 was 12.8 g/dL.

The time span for returning to the examination causes the results of the examination of haemoglobin levels after the administration of blood supplement tablets to vary. The longer the time span of return, the higher the haemoglobin level, even though the amount of blood supplement tablets consumed is the same, with one tablet provided every day. This is due to other influencing factors, such as food that enters the body and produces heme levels in the blood, so that the haemoglobin levels of donors who returned on day 5 were lower than the haemoglobin levels of donors who returned on days 6 and 7 (12).

The internal and external factors experienced by the prospective donors caused the results of the haemoglobin level examination after the blood supplementation tablet consumption treatment to differ. Based on the results of the examination, 23 potential donors experienced an increase in haemoglobin levels, and one potential donor did not experience an increase/or decrease in haemoglobin levels. After observation, prospective donors who had a fixed haemoglobin level had consumed blood supplement tablets entirely according to the rules of use, as instructed, namely one tablet per day. Still, other factors hindered the increase in haemoglobin levels, namely lack of rest for a few days before the initial screening of blood donors, busy work activities and irregular meals because the prospective donor was a worker (13).

Research about haemoglobin levels after the administration of Fe tablets varies depending on the influencing factors, one of which is the body's absorption rate of iron nutrients, where the body can only absorb vegetable iron sources of 1-2% and animal iron as much as 10-20%. In this study, the administration of Fe tablets was optimised, increasing haemoglobin levels of at least 0.5 g/dL (14).

c. Differences in Haemoglobin Levels Pre and Post Administration of Blood Addition Tablets

Based on the data obtained from the research on "Description Of Giving Blood Supplement Tablets To Donor Haemoglobin Levels In PMI Banyumas Regency", there was a difference in the haemoglobin levels of

failed donor candidates due to low haemoglobin levels before and after being given blood add tablets. There was an increase in haemoglobin levels in prospective donors due to the factors of taking blood supplement tablets, donors regularly taking the pills as directed, a healthy body condition before the haemoglobin level check, and donor readiness to undergo the check.

5. CONCLUSIONS

Based on the study's results, it can be concluded that the average haemoglobin level of prospective donors before receiving blood-added tablets was 11.48 g/dL in 24 donors. The average haemoglobin level of prospective donors after being given blood-added tablets was 12.57 gr/dL. The lowest haemoglobin level of prospective donors before receiving blood-added tablets was 10.4 g/dL, and the highest haemoglobin level was 12.4 g/dL. The lowest haemoglobin level after taking blood supplement tablets was 11.1 gr/dL and the highest was 14.3 gr/dL. From the mean of pre- and post-blood supplement tablets, the increase in haemoglobin level was 1.09 gr/dL.

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