Effectiveness of PMT Supplement Biscuit to Hemoglobin Content of Pregnant Woman in Pare Pare City

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Abstract

Malnutrition that occurs during pregnancy has a cumulative effect on pregnant women's hemoglobin levels. Currently there is a lack of information on the effectiveness of new PMT biscuits produced by the Ministry of Health, Indonesia in 2015 against pregnant women hemoglobin level. This research was conducted using quantitative method that aims to analyze the effectiveness of PMT biscuits containing multi micronutrients to pregnant women hemoglobin and also to investigate the difference of hemoglobin level before and after consuming PMT biscuit. 54 questionnaires were distributed to all participants by using purposive sampling, which were then analyzed by applying the paired sample t-test in SPSS. The respondents were divided into two groups which are obedient pregnancy women and disobedient pregnancy women in consuming the PMT biscuit. The study discovered that there was no significant difference at the hemoglobin level in the group of obedient pregnancy women before and after consuming the PMT biscuit. The study also found that there was no significant difference at the hemoglobin level before and after consuming the PMT biscuit in the group of disobedient pregnancy women. The hemoglobin level before consuming the PMT biscuit was a bit higher than the hemoglobin level after consuming the PMT biscuit in the group of obedient pregnancy women, meanwhile the group of disobedient pregnancy women experienced lower level of hemoglobin before consuming the PMT biscuit compared with the hemoglobin level after consuming the PMT biscuit. However, the difference in hemoglobin level did not show a significant difference among the groups of pregnancy women.

Keywords: affectivity; PMT biscuit; pregnancy women; hemoglobin; paired sample t-test.

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1. Introduction

Nutrition problems are still a major public health problem in developing countries including Indonesia. Maternal and child deaths can be caused by actual nutritional problems that can be prevented. Malnutrition that occurs during pregnancy can have a cumulative impact on the nutritional status of the fetus represented by a non-optimal birth weight. Low nutrient intake and less nutritional status in pregnant women during pregnancy can lead to various adverse effects for the mother and baby [1]. One of its effects on pregnant women is iron deficiency (Fe) which causes anemia and ultimately affects low birth weight data shows that the percentage of Low Birth Weight (LBW) of 10.2% decreased from the year 2010 that is 11.1%. In 2013, the proportion of the highest occurrence of LBW occurred in Central Sulawesi (16.2%) and the lowest in North Sumatra (8.2%) [2] .A study in eastern Lombok found that women who consumed Multi Micronutrient supplements experienced an 18% reduction in newborn mortality, compared with infant mortality in women using IFA, as well as a 25% reduction in infant mortality from malnourished women, declining mothers with anemia status, 11% reduction in neonatal mortality and 33% reduction in low birth weight babies. One of the foods that contain multi-micronutrients is a sandwich-coated extra food biscuit (PMT), where it can increase the hemoglobin levels of pregnant women and prevent bleeding during pregnancy. It also can gain weight and upper arm circumference of pregnant women.

So by consuming these biscuits regularly is considered able to optimize the nutritional status of pregnancy. Therefore, the provision of biscuits containing multi micronutrients is increasingly felt important in developing countries such as Indonesia because women or pregnant women who consume multi micronutrients are those who actually consume enough in the daily diet while the risk of shortage just do not consume [3-5]. According to Barker [6] the lack of consumption of Multi Micronutrients during pregnancy will have an impact on the failure of growth and development during the fetus which is permanent to the structure, physiology and metabolism of the body that will increase non-communicable diseases such as heart, stroke and diabetes mellitus. Birth Weight is also associated with the fulfillment of both macro and micro nutrients during pregnancy. Fetal growth and development accelerate in third trimester pregnancy so that adequate energy and protein intake is required. The nutritional adequacy during pregnancy affects the birth weight [7,8]. The nutritional status of pregnant women will affect the condition of the baby being born. If the mother is anemic it will be risky to deliver a baby with low birth weight [9].

Based on these studies, the provision of multi micronutrients is necessary to be done in Indonesia, given the limited reports on the provision of multi micronutrients in pregnant women. For that it is necessary to conduct research on the effectiveness of PMT biscuit trial program on hemoglobin levels of pregnant women. This study aims to see the effectiveness of biscuit PMT with parameters of hemoglobin levels of pregnant women and birth weight. This research is a new research because there has never been previously similar research on the type of biscuit PMT (supplementary feeding) of pregnant women, where this biscuit is a new biscuit in production by the directorate of nutrition Ministry of Health in 2015.

This biscuit contains Multi Micronutrients. Pregnancy is a time when there is a fetus inside a woman's womb. Pregnancy is preceded by the conception of male sperm cells with eggs produced by the ovaries. After

conception, new fetuses form and grow inside the mother's womb which is a safe and comfortable shelter for the fetus.   Pregnancy is a physiological event that starts from conception until the birth of the fetus. The normal length of pregnancy is 280 days (40 weeks or 9 months 10 days) calculated from the first day of the last menstrual period . Proper and balanced nutrition supports the development of the brain, immune system, and growth of the baby since in the womb to remain optimal. Micronutrients are vitamins and minerals that are not produced by the body and need to be noticed, because they can only be obtained from food and require variations from the menu because the source comes from different foods. With this tool, you can get complete info on various important micronutrients in various stages of pregnancy, as well as food sources to meet the needs of micronutrient Mother.

Get also important tips from Nutriclub Experts to meet the essential micronutrient needs of Mother and fetus [10-13]. Currently the government is programming additional feeding for pregnant women in the form of biscuit lapis (sandwich). The nutritional value of the biscuit is as follows:

Table 1: Gynecology of PMT Biscuits

Contents	amount (gr)	% AKG	Contents	amount (gr)	% AKG
Fat	13	21	carbohidrat	28	9
Protein	8	9	Natrium	240	16
Vit A		50	Folic acid		50
Vit D		60	Pantotenat acid		55
Vit E		55	Selenium		55
Vit B1 (Thiamin)		60	Flour		60
Vit B2(Rboflavin)		60	Jodium		25
Vit B6(Pridoksin)		60	Zinc		25
Vit B12 (Siano Kobalamin)		60	Iron		25
Vit C		60	Fosfor		15
Vit B3 (Niasin)		55	Calsium		15
Source: Ministry of Health RI, 2015					

Hemoglobin is a protein rich in iron. It has affinity (oxygen) to oxygen and with oxygen it forms oxihemoglobin in red blood cells. Through this function oxygen is carried from the lungs to the tissues [14-16]

2. Materials and Methods

The design of this study used "Quasy Experiment", that is pre- test and post-test with control group design. The study group was divided into two groups with a design scheme:

Table 5

Subject	Pre-test	Treatment	Post-test
Obedient Group consuming biscuits	01	x	03
Unobedient Group consuming biscuits	02		04

Note:

01   : Measurement of treatments before intervention

02   : Initial measurement of control groups

03   : Measurement of treatment groups after intervention

04   : Measurements of the second control group (post-test)

X   : intervention by giving biscuit

Place and time of research

This research will be conducted in the town of Pare pare.

Prior to the intervention, an initial data was collected. The study was conducted in January 2017 - December 2017.

Population and Sample Research

1.   Population

The study population is all pregnant women who have gestational age of first trimester in Parepare Town.

2.   Sample

The sample of this research is partially pregnant women who have first trimester of pregnancy in Parepare Town. research sample obtained by purposive sampling method.

The sample size is determined by the Slovin formula as follows:

$$n = \frac{N}{1+N(e)^2}$$

n   :Amount of sample

N   :Amount of population

e   : The percentage of errors that are tolerated in sampling, in this case using e = 5% (0,05)

Based on the formula then it can be determined the sample size of 54 respondents. The samples of the research were obtained by purposive sampling method, which is sampling based on predetermined criteria .

Research Instruments and Data Collection Procedures

1.   Research Instruments

The instruments used in this research are as follows:

    a.   Pregnancy is assessed by taking a pregnancy test.
    b.   Examination of fetal heart rate using Doppler.
    c.   Anthropometric measurements (weight, height, upper arm circumference, LILA).
    d.   Hematology test. A hemoglobin (HB) examination was performed using Hemocue.
    e.   Checklist and questionnaire.

2.   Data Collection Procedures

    a.   Research preparation
    b.   Initial data collection

Data Analysis

This study uses statistical analysis with the help of SPSS program. The statistic test used is paired sample t-test, because the respondents are divided into 2 groups to know the difference between each group obedient and non-compliant at the time before and after taking biscuit PMT.

3. Results

The main objective of this study is to analyze the effectiveness if PMT biscuits containing multi micronutrients to pregnant women hemoglobin and also to investigate the difference of hemoglobin level before and after consuming PMT biscuit. Table 1 below describes the difference of mean between HB1 and HB2:

Table 1: Paired Samples Statistics for Disobedient pregnant women in consuming biscuit

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	HB1	10,738	37	2,2865	,3759
	HB2	11,049	37	1,7347	,2852

As depicted in Table 1 above, the mean value of HB1 is slightly lower than HB2, meaning that the hemoglobin level before consuming the PMT biscuit shows lower level compared to the hemoglobin level after consuming the PMT biscuit.

To investigate whether there is a significant difference between pre and post biscuit consumption can be seen in the table 2 below:

Table 2: Paired Sample Test

	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 HB1 - HB2	-0,3108	2,7972	0,4599	-1,2434	0,6218	-0,676	36	0,503

Table 3: Paired Samples Statistics for Obedient pregnant women in consuming biscuit

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	HB1	11,571	17	1,4721	,3570
	HB2	10,806	17	1,4741	,3575

Based on the table 3 above, the mean value of HB1 is slightly higher that HB2 and therefore it can be interpreted that the hemoglobin level before consuming the PMT biscuit shows higher level compared to the hemoglobin level after consuming the PMT biscuit.

Table 4: Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	HB1 - HB2	0,7647	1,9349	0,4693	-0,2301	1,7595	1,63	16	0,123

Table 4 above reveals that the P-value is 0,123 which is above the threshold value of 0,05. Therefore, it can be interpreted that the difference between hemoglobin level before and after consuming the PMT biscuit are found to be not significant.

4. Discussion

This study was directed to measure the effectiveness of PMT biscuits on the quality of hemoglobin levels of pregnant women.

From 54 samples there are 17 samples who abide by eating biscuits. Of these groups there is no significance between maternal hemoglobin levels of obedience before and after taking biscuit PMT. It shows the value of Sig (2-tailed) 0.123. The disobedient sample group consumed the PMT biscuit, amounting to 37 pregnant women [17].

There is also no significance between hemoglobin levels before and after taking biscuit PMT which can be shown with a Sig (2 tailed) 0.503 value. This is less in line with previous studies that women who consume micronutrients will increase hemoglobin levels in his study of statistical results showed vitamin A intake correlated with hemoglobin levels (p = 0.015; r = 0.287). The addition of PMT mostly have any increase of the mother health and nutrient during the certain period. [18-20]

5. Conclusion

There was no significant difference between obedient pregnant women of hemoglobin levels. There was no significant difference between hemoglobin levels of pregnant women who did not comply before and after taking biscuit PMT in Pare Pare City.

The hemoglobin level before consuming the PMT biscuit was a bit higher than the hemoglobin level after consuming the PMT biscuit in the group of obedient pregnancy women, meanwhile the group of disobedient pregnancy women experienced lower level of hemoglobin before consuming the PMT biscuit compared with the hemoglobin level after consuming the PMT biscuit. However, the difference in hemoglobin level did not show

a significant difference among the groups of pregnancy women.

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