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# Effectiveness of Giving Dangke Crackers on Improving Hemoglobin Levels in Trimester Pregnant Woman II with Anemia

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## ABSTRACT

**Background:** Administration of Tablets Added to Blood (TTD) has not yet fully helped reduce the incidence of anaemia in pregnant women in this community is supported by data found in the field. Dangke crackers become an alternative source of protein that can help in increasing haemoglobin levels in pregnant women so as not to be anaemic.

**Research Methods:** The study population was 186 anaemic pregnant women. A purposive sampling was conducted by considering inclusion and exclusion criteria so that they are obtained a sample of 60 pregnant women. The intervention group was given dangke crackers as many as 90 packs in 12 weeks accompanied by TTD from health workers while the control group only consumed TTD from health workers. Measurement Hemoglobin using *Hemocheue HB 201+* was done twice before and after the intervention. Also, measurements were taken of nutrition for pregnant women using the 24-hour recall method.

**Results:** The results of this study indicate that there is a significant influence, p-value = 0.001 (p < 0.05) dangke crackers in increasing haemoglobin levels in mothers Trimester II Pregnancy with Anemia in the Kaberehealth care center and Enrekang City Health care center

**Conclusion:** The results of data analysis and evaluation results on the dangke cracker intervention occurred a significant increase in haemoglobin levels in second-trimester pregnant women with anaemia in Kabere Health care Center and Enrekang City Health care center.

**Key Words:** Dangke crackers, Nutrition, Hemoglobin, Anemic, Pregnant women

## INTRODUCTION

Anaemia in pregnant women is defined if the haemoglobin level is less than 11 gr/dl. The impact of anaemia on pregnant women has a mild impact and a severe impact. When content haemoglobin is lower than 6 g / dL, it can arise significant complications in mother and fetus. Low haemoglobin levels cause reduced supply needs fetal oxygen and can cause heart failure in the mother. Besides anaemia in the mother pregnancy also causes obstacles to the growth of the fetus both body cells and cells brain, abortion, duration of parturition due to lack of uterine thrust, bleeding postpartum, and susceptible to infection.<sup>1</sup> Crackers in the second trimester of anemia in pregnant women are inspired by the number of anemia in pregnant women which prasan it supported Dunk crackers have become an alternative source of protein that

helps increase hemoglobin levels in pregnant women to prevent anemia. In general, pregnant women experience an iron deficiency in the second trimester and three, due to high iron requirements coupled with an increase in plasma fluid blood that causes hemodilution but is not accompanied by iron intake adequate, it can cause anaemia in pregnancy.<sup>2</sup> Government efforts in granting TTD have not shown a decline prevalence of anaemia of pregnant women in Indonesia. There are still many pregnant women who do not comply with iron supplementation although iron supplements have been shown to increase levels of haemoglobin to prevent anaemia. Take iron pills for pregnant women still low-standard, research by Octaldina (2019) most of the respondents are still consume less than 90 tablets during pregnancy, reaching 43.07%.<sup>3</sup> Dangke is a superior local food product and traditional food made of dome-shaped fresh milk because

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it uses a coconut shell as moulds and wrapped in banana leaves.<sup>4</sup> Dangke crackers are one of the results processed from dangke whose main ingredient is cow/buffalo milk which is the source of good animal protein. With a protein content of 17.20%.<sup>5</sup> Dangkecrackers come with a composition that is easily digested and liked by the community at large with a high content of protein, minerals, and vitamins, making milk as a nutritious food source, easily obtained and processed directly Public.<sup>6</sup> Dangkecrackers are an alternative source of protein the solution considering protein plays an important role in the transportation of iron in the body. Lack of protein will affect the metabolism of iron which can increase blood hemoglobin levels.<sup>2</sup> Dangke in another form of dangke cracker is a superior local food product and a very popular traditional food, made from fresh milk in the shape of a dome because it uses a coconut shell as a mould and is wrapped in banana leaves. This product is known as Enrekang cheese which has high nutritional value, one of which is the protein content of about 17.20%. Dangke chips come with a composition that is easily digested and liked by the general public with high protein, mineral and vitamin content, making milk a nutritious source of food, easy to obtain and processed directly by the community.<sup>10</sup>

## MATERIALS AND METHOD

### Research sites

The study was conducted in the working area of Kabere Health care center and Enrekang City Health cares center in January-April 2020. This research has received ethical approval by the commission ethics of health research FKM with Number 48 / UN4.14.1 / TP 01.01 / 2020. Type The research used is quantitative research and research design used is *Quasi Experiment* where there are 2 test groups namely 30 samples control group and 30 sample intervention groups. The total sample in this study 60 samples was following the inclusion criteria, i.e.; pregnant women gestational age 13-27 weeks, Hb levels of 8 - 11 mg / dL, upper arms  $\geq$  23.5 cm, a single fetus, did not consume multivitamins and other minerals besides Ferum during the study, has no history of infectious and genetic diseases and helminthiasis, like and willing to consume dangke crackers during the study, willing to follow the research until the deadline and conditions that have been set, set by the researcher.

Exclusion Criteria; respondents do not consume dangke crackers in the amount and time, determined by researchers, resign from research, respondents are sick.

### Intervention procedure

The first step is taken before an intervention is to take measurements haemoglobin with the *Hemochue* apparatus and measure nutritional intake with the recall method 24hours in each group so that the Hb levels and nutrient intake are known

before the intervention. In this case, the researcher was assisted by and the midwife in charge. then explain to the respondent that sampling will take place next blood after consuming dangke crackers. Respondents in the intervention group had to spend 1 packet of crackers dangke (100gr) per day or 90 packs of dangke crackers for 12 weeks with still consume TTD which are distributed by health workers. Whereas the control group only consumed Fe tablets from health workers. Dangke is delivered every week as many as 7 packs for each respondent. Once a week, researchers visit respondents to deliver crackers dangke while monitoring the amount of consumption of dangke and Fe tablets and complaints on monitoring card that contains the number of crackers and complaints during the respondents consume dangke crackers. For some 12 consecutive weeks, researchers conducted routine activities, However, at the end of the study, there were 5 respondents in the intervention group dropped out. So the number of intervention groups until the end of the study were 25 samples in the intervention group and the control group there were 30 samples. In the 13th week, HB measurement and second stage nutrient intake were taken to determine the level of HB and nutritional intake after the intervention. measurement of nutritional intake of pregnant women using the 24-hour recall method and processed by Nutrisurvey. Hemochue HB 201+. Statistical test in this study using SPSS 23 software. The results were analyzed using the Wilcoxon test and Paired t-test to test one group. Independent t-test and Mann Whitney test to test two group.

## RESULTS

During the study, 90 packs of dangke crackers were given to anaemic pregnant women Consuming one pack (100gr) per day for 12 weeks can be seen from the results table 1 data shows that the characteristics of mother's age, employment, education among the control groups and the intervention almost similar.

**Table 1: Distribution of respondent characteristics.**

Characteristics of Respondents	Intervention	Control	P-value
Mother's age (n, %)			
High risk	5	6	1.000
Low risk	20	24	
Employment (n,%)			
Work	11	8	0.178
Does not Work	14	22	
Mother's Education (n,%)			
High ( $\geq$ SMA)	12	17	0.522
Low (< SMA)	13	13	
Income	1248000 $\pm$ 529047.887	1050000 $\pm$ 528824.330	0.169

<sup>a</sup> *Chi-square test*, source: Primary data, 2020

The result of the analysis showed an increase in post-test protein intake which significant in the intervention group with *p*-value: 0.001 (*p* < 0.05) (table 2). Table 3 showed an increase in post-test iron intake in the intervention group intervention with a *p*-value: 0.001 (*p* > 0.05).

**Table 2: Differences in protein intake of pregnant women between control groups with the intervention group.**

Protein	N	Mean ± SD		Difference The mean	P-value
		Pre	Post		
Control	30	74.28 ± 3.29	74.06 ± 3.28	0,22	0.545 <sup>a</sup>
Intervention	25	74.23 ± 3.56	76.37 ± 4.31	2.14	0.002 <sup>a</sup>
<i>P</i> -value		0.993 <sup>b</sup>	0.021 <sup>b</sup>	0.001 <sup>b</sup>	

<sup>a</sup> Wilcoxon <sup>b</sup> Mann-Whitney

Table 4 shows Increased haemoglobin levels of pregnant women pre and post-test in the group control and intervention groups, from the results of statistical tests in the intervention group there are differences in haemoglobin levels of pregnant women pre and post-test (*p* < 0.05 ). This is supported by their existence most pregnant women show elevated Hb levels. Increased HB levels an average of 10.51-11.23 gr/dl with a mean difference of 0.72. Anaemic pregnant women the control group also experienced an increase but the average increase only ranged from 10.45 -10.59 gr/dl with a mean difference of 0.14.

**Table 3: Differences in iron nutrient intake of pregnant women pre and post-test in the group control and intervention groups.**

Iron	N	Mean ± SD		Difference The mean	P-value
		Pre	Post		
Control	30	38.05 ± 1.21	38.15 ± 1.77	0.1	0.643 <sup>a</sup>
Intervention	25	38.25 ± 1.06	38.70 ± 1.44	0,45	0.129 <sup>a</sup>
<i>P</i> -value		0.643 <sup>b</sup>	0.219 <sup>b</sup>	0.001 <sup>b</sup>	

<sup>a</sup>Wilcoxon<sup>b</sup>Mann-Whitney

**Table 4: Increased hemoglobin levels of pregnant women pre and post-test in the group control and intervention groups**

Haemoglobin	N	Mean ± SD		Difference The mean	P-value
		Pre	Post		
Control	30	10.45 ± 0.36	10.59 ± 0.48	0,14	0.105 <sup>a</sup>
Intervention	25	10.51 ± 0.38	11.23 ± 0.72	0,72	0.001 <sup>a</sup>
<i>P</i> -value		0.543 <sup>b</sup>	0.001 <sup>b</sup>	0.001 <sup>b</sup>	

<sup>a</sup>Paired T-test; <sup>b</sup>independent T-test.

## DISCUSSION

Dangke crackers are one of the processed products from cow/buffalo milk is a good source of animal protein. With as much protein content 17.20%.<sup>8</sup> Foods that are high in protein, especially foods that come from animals usually contain more iron.<sup>9</sup> Animal protein intake can increase the absorption of iron in the body. Low consumption of protein intake can cause low absorption of iron by the body. This situation can be resulting in the body’s iron deficiency and can cause anaemia or decreased haemoglobin level.<sup>10</sup> Dangke crackers consumed are accompanied by suspected blood added tablets able to support the needs of nutrients needed by the body while improving the metabolism of pregnant women which triggers increased body function and improves appetite eat so that it increases food intake. This is in line with the results of the study Natsir 2018 which concluded that the dangke crackers were processed products dangke with other ingredients in compositions that are easily digested with high protein, mineral, and vitamin content, making dangke as a source alternative food ingredients to support other nutritional needs.<sup>11</sup>

One of the nutrients that has an important role in increasing haemoglobin levels in this study is protein. Protein is useful as a builder and regulator, besides protein also has a role in the transportation of iron to the spinal cord for the formation of red blood cells.<sup>7</sup> Protein also helps the absorption of vitamin C to support the synthesis process of red blood cells.<sup>12</sup> Protein is the main component of globin which plays a role in iron transportation and storage. Besides, iron absorption in the small intestine is assisted by heme carrier protein (HCP1). The absorption of iron in the small intestine is assisted by proteins which act as a means of transport, namely transferrin and ferritin.<sup>11</sup>

The results of this study are in line with the research of Al-Rahmad 2017 which shows that the level of protein consumption has the strongest relationship with haemoglobin levels. Papu-tungan et al (2016) concluded from the results of his study that there is a relationship significant between iron and protein intake in the event of anaemia, where it is of value significance of *p* = 0.001 and *p* = 0.003 (*p* < 0.05). Another factor that supports the increase in haemoglobin levels in the pregnant women the intervention group was better socio-economic than the control group. 66.7% are pregnant women who have a high income (> 1 million / month). Although thus the level of education tends to be lower. Therefore most of them are pregnant women who work mainly in the informal sector readers and sellers of dangke and other dairy products. So this pregnant mother has more time at home and pays more attention to food intake consumed every day. Supported by the purchasing power of good food as well the availability of food with good quantity and quality is more guaranteed. Low education is often associated with insight

and knowledge low anyway<sup>7</sup> Pregnant women are expected to have good knowledge to be able to apply his knowledge in managing consumption and processing patterns food, in particular, consumes food according to the nutrients needed at the moment pregnant, so as not to experience lack of food intake. The results of the study value  $p = 0.02$  that the level of education greatly affects the nutritional intake of pregnant women. This is not in line with the results research because most respondents in the dominant intervention group have a low level of education (elementary-junior high).

Education is not always directly proportional to the level of knowledge. Knowledge is not only obtained from formal education but also informal education. The era of globalization with the development of technology as it is today allows them to access anything they want to know included in terms of the selection and processing of daily food through the internet.

### CONCLUSION

The results of this study are the effect of giving dangke crackers to increased blood haemoglobin levels in second-trimester pregnant women with anaemia in Kabere health center and Enrekang district health center. Further researchers can develop research on the content and other preparations of dangke as a highly nutritious local food that can be more useful.

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