

**EFFECT OF PUMPKIN SEED CAPSULE (*CUCURBITA MOSCHATA*) IN ENERGY-DEFICIENT PREGNANT WOMEN ON BODY WEIGHT AND NEWBORN BODY LENGTH IN BONE DISTRICT**

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**ABSTRACT**

**Background.** Pregnant women who suffer from Chronic Energy Deficiency (CED) characterized by Upper Arm Circumference (LILA) <23.5 cm are at risk of preterm birth and low birth weight (LBW). Pumpkin seeds are rich in macronutrients and micronutrients that can be one of the efforts to fulfill the nutrition of pregnant women. **Objective.** This study aims to determine the effect of pumpkin seed capsules (*Cucurbita Moschata*) on the weight and length of newborns in bone district. **Methods.** This research is a type of *Quasi Experimental with non randomized posttest with control group design*. The study was conducted in the working area of Watampone Health Center and Biru Health Center. The sample was 61 pregnant women who were divided into 2 groups (30 pregnant women in the intervention group and 31 pregnant women in the control group). The intervention group consumed pumpkin seed capsules 2 times per day at a dose of 700 mg per capsule while the control group consumed blood supplement tablets. Data were analyzed using *Independent Samples Test, Wilcoxon, Mann-Whitney, Chi-Square*. **Results. There** was a significant increase ( $p < 0.05$ ) in the average body weight of newborns in the intervention group which was  $3.063 \pm 0.210$ , while the control group was  $2.910 \pm 0.279$  and in the average body length of newborns in the intervention group which was  $49.47 \pm 1.306$ , while the control group was  $48.55 \pm 1.179$ . **Conclusion.** There is a difference in the increase in body weight and length of newborns between the group of pregnant women who consume

pumpkin seed capsules (intervention group) and pregnant women who consume blood supplement tablets (control group).

***Keywords: Infant Weight, Pumpkin Seed Capsules, Chronic Energy Deficiency, Pregnant Women, Infant Body Length***

## **INTRODUCTION**

Chronic energy deficiency in pregnant women is a condition of the mother's lack of protein and energy intake during pregnancy which can lead to health problems in the mother and fetus. Pregnant women who are at risk of chronic energy deficiency can be seen from the measurement of Upper Arm Circumference (LILA) <23.5 cm.<sup>1</sup>. Chronic Energy Deficiency (CHD) will be at risk of perinatal mortality and at risk of giving birth to babies with Low Birth Weight (LBW).<sup>2</sup>

The World Health Organization (WHO) reports that the prevalence of Chronic Energy Deficiency (CED) in pregnancy globally is 35-75% which is significantly higher in the third trimester compared to the first and second trimesters of pregnancy. WHO also noted that 40% of maternal deaths in developing countries are related to chronic energy deficiency. Pregnant women who suffer from malnutrition such as chronic energy deficiency have a greater risk of morbidity, therefore malnutrition in pregnant women must be avoided so that pregnant women are a target group that needs special attention.<sup>3</sup>

Based on Basic Health Research (Riskesdas) data (2022), it shows that the proportion of chronic energy deficiency (CHD) risk in pregnant women in 2021 in the age group of mothers at risk, namely 15-19 years, is 33.5%, at reproductive age the incidence of chronic energy deficiency (CHD) in pregnant women is 12.3% and at the age of >35 years the incidence of chronic energy deficiency (CHD) is 8.5%. So that the most risky incidence of chronic energy deficiency in pregnant women in terms of age is 15-19 years.<sup>4</sup>

Chronic Energy Deficiency (CHD) will be at risk of death during the perinatal period and is at risk of giving birth to babies with low birth weight (LBW). Eating habits in pregnant women are one of the characteristics that can describe behavioral patterns related to the type of food consumed, the frequency of portions eaten, then taboos or flavors that are liked or disliked for the food to be eaten, then how to choose the food to be eaten.<sup>2</sup>

The growth and development period in infants is a golden period as well as a critical period of a baby's development, namely at the age of 0 - 12 months.<sup>5</sup>. At this time it is also said to be the golden period because at this time the baby is very sensitive to the environment and needs good nutrition and

stimulation during growth and development.<sup>6</sup> and requires good nutritional intake and stimulation during growth and development. Low Birth Weight (LBW) is the weight of a baby born less than 2500 grams up to 2499 grams. Weight or size at birth is an indicator of a child's vulnerability to the risk of disease in childhood.<sup>7</sup>.

Nutrition is an important part of growth and development, as it is linked and related to health and intelligence.<sup>8</sup>. The nutritional status of infants and toddlers is one of the indicators of community nutrition, and has been developed into an indicator of community health and welfare. This is because groups of infants and toddlers are very vulnerable to various malnutrition diseases.<sup>9</sup>. Birth length describes the linear growth of the baby while in the womb. A low linear measure usually indicates undernutrition due to energy and protein deficiencies suffered in the past.<sup>10</sup>.

The use of pumpkin seeds to overcome the problem of chronic energy deficiency and anemia in pregnant women. Through this research, it is expected that more information will be obtained about pumpkin seed capsules. Previous research shows that the nutritional content contained in 100 grams of pumpkin seeds is 559 kcal of energy, 30.23 grams of protein, 49.09 grams of fat, 10.71 grams of carbohydrates, 7.81 mg of zinc.<sup>11</sup>. Research made from local foods such as pumpkin seeds on pregnancy *outcomes* is still very limited. Therefore, researchers are interested in examining the benefits of functional food pumpkin seed capsules to overcome the problem of chronic energy deficiency (CED) in pregnant women.

## **MATERIALS AND METHODS**

### **Ethics**

This research has been approved by the Ethics Committee of the Faculty of Public Health, Hasanuddin University with number 705/UN4.14.1/TP.01.02/2024.

The participation of respondents in this study is voluntary, and respondents who are willing to participate have filled out *informed consent*.

### **Research Design and Sample**

This research is a type of *quasi-experimental with a non-randomized posttest with control group design*. The study was conducted in the working area of Watampone Health Center and Biru Health Center. The sample was 61 pregnant women who were divided into 2 groups (30 pregnant women in the intervention group and 31 pregnant women in the control group), where the intervention group consumed pumpkin seed capsules 2 times per day at a dose of 700 mg per capsule. Meanwhile, the control group was given blood supplement tablets (TTD) containing 60 mg of iron and 0.40 mg

of folic acid, and consumed 1 tablet per day. Both groups followed the intervention for 60 days. This study also conducted anthropometric measurements on newborns using a baby scale to measure body weight and a tape measure to measure body length.

**Quality Control**

**Conducting instrument standardization**, calibration is carried out on the tools used to ensure that the tools used actually function properly and are able to provide the expected measurement results.

**Field control**, Ensuring respondents consume pumpkin seed capsules according to the instructions given by controlling daily through whatsapp created for respondents and controlling once every two weeks face-to-face with respondents.

**Statistical Analysis**

In this study, data analysis was carried out using SPSS version 25 software developed by the IBM company. The confidence level in this study is 95% and the significance level is 0.5. The first analysis was a data normality test using the *Shapiro-Wilk test*. The *paired t-test* was used if the data obtained in the study were normally distributed and the *Wilcoxon test* if the data distribution was not normal. To analyze differences in newborn weight, the unpaired t-test was used if the data was not normally distributed, while the *Mann-Whitney test* was used if the data was normally distributed.

**RESULTS**

**a. Respondent Characteristics**

**Table 1: Characteristics of Respondents**

Variables	Group				P Value
	Intervention		Control		
	n (30)	%	n (31)	%	
<b>Age (Year)</b>					
<20 or >35	3	10,0	3	9,7	<b>0,654</b>
20-35	27	90,0	28	90,3	
<b>Employment Status</b>					
Work	8	26,7	14	45,2	<b>0,133</b>
Not working / housewife	22	73,3	17	54,8	
<b>Parity</b>					
Primigravida	18	60,0	17	54,8	<b>0,684</b>
Multigravida	12	40,0	14	45,2	
<b>Pregnancy Age</b>					
1st Trimester	3	10,0	11	35,4	0,018
Trimester 2	27	90,0	20	64,5	

Source: Primary Data, 2024

The characteristics of respondents shown in Table 1 are categorized into two, namely the age group <20 or >35 in the intervention group and control group as many as 3 people (10%) while the age of 20 - 35 years in the intervention group was 27 people (90%) while the control group was 28 people (90.3%). In the employment status variable, the most respondents were not working in the intervention group as many as 22 people (73.3%) and the control group as many as 17 people (54.8%) while the working category in the intervention group was 8 people (26.7%) and the control group was 14 people (45.2%). For the parity variable in this study, the majority of respondents were primigravida or a woman who was pregnant for the first time, both in the intervention group as many as 18 people (60%), the control group as many as 17 people (54.8%). In the variable gestational age obtained most in trimester 2 for both groups. As for the intervention group as many as 27 people (90%) and the control group as many as 20 people (64.5%). Based on the results of statistical tests using the *chi-square* test, the results of age variables, employment status, and parity between the two groups did not differ, with a *p* value > 0.05 so that the data could be said to be homogeneous.

**Table 2. Frequency Distribution of Respondents' Weight and Length of Newborns in the Watampone Health Center and Blue Health Center Working Areas**

Newborn Weight	Pumpkin Seed Capsule Group (Intervention)		Blood Addition Tablet Group (Control)		P Value
	n (=30)	%	n (=31)	%	
Normal (2500 grams)	30	100,0	31	100,0	.a
Less (<2500 grams)	-	-	-	-	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>31</b>	<b>100</b>	
<b>Newborn Body Length</b>					
Normal (48-52 cm)	28	93,3	27	87,1	<b>0,671</b>
Short (<48 cm)	2	6,7	4	12,9	
<b>Total</b>	<b>30</b>	<b>100</b>	<b>31</b>	<b>100</b>	

Source: Primary Data, 2024

Table 2 shows that there were no babies with low birth weight (<2500 grams) in both the intervention and control groups. The normal newborn weight (2500 grams) in the intervention group was 30 babies (100%) and in the control group there were also 31 babies (100%) so that there was no difference between the two groups that was meaningful. The results of statistical tests using the *chi-square* test obtained a *p* value = constant. In the newborn's body length, it can be interpreted that the respondents who were categorized as normal in the intervention group were 28 babies (93.3%) and the control group were 27 babies (87.1%). While the length of the newborn's body was categorized as short in the intervention group as many as 2 babies (6.7%) and the control group as many as 4 babies

(12.9%). The results of statistical tests using the *ch-square* test obtained a *p value* = 0.414 so that it shows there is no significant difference between the two groups either consuming pumpkin seed capsules or blood supplement tablets in protecting the newborn's body length.

**Table 3. Differences in Weight and Length of Newborns in the Watampone Health Center and Blue Health Center Working Areas**

Variables	Group		Mean Difference	P Value
	Pumpkin Seed Capsules (Intervention)	Blood Addition Tablets (Control)		
	n (=30)	n (=31)		
	Mean±SD	Mean±SD		
Newborn Weight (kg)	3,063 ± 0,2109	2,910 ± 0,2797	0,153	<b>0,019</b>
Newborn Body Length (cm)	49,47 ± 1,306	48,55 ± 1,179	0,918	<b>0,001</b>

Source: Primary Data, 2024

In Table 3 based on newborn weight, the average weight of the intervention group was 3.063 kg. The weight of newborns in the intervention group was higher than the weight of newborns in the control group by 2.910 kg. The results of statistical tests using the *Independent Samples Test* obtained a *p value* = 0.019 so that there is a difference in newborn weight between the intervention group and the control group. In the length of the newborn's body, the average value in the intervention group was 49.47 cm. The newborn body length in the intervention group was higher than the newborn body length in the control group of 48.55 cm. The results of statistical tests using the *Mann-Whitney Test* obtained a *p value* = 0.001 indicates that there is a difference in the length of the newborn's body in the two groups.

## DISCUSSION

Pregnancy is a moment that determines the quality of a person in later life, because the growth and development of a child is determined since he is in the mother's womb. Nutritional needs play an important role during pregnancy because it can affect the condition of the mother and fetus. The nutritional needs of pregnant women will increase compared to non-pregnant women because the fetus is developing in the womb. Nutritional needs must be ensured to meet the quality standards of all nutrients contained in the food consumed. One of the problems that can arise in pregnant women, especially related to nutritional status, is chronic energy deficiency (CHD).

The cause of SEZ in pregnant women can occur before pregnancy and the mother already suffers from energy deficiency, because in pregnant women the energy needs will increase compared



to mothers who are not pregnant. Pregnant women with SEZ can occur due to direct causes, which consist of the presence or absence of additional food intake or infection and consumption patterns, while indirect causes include inhibition of the function of nutrients due to an imbalance in amino acid levels in the body, decreased appetite and food consumption of the mother, poor hygiene conditions, and too many children in the house.

The effects that can occur in pregnant women with SEZ are fatigue, pale face, and reduced breast milk production after delivery. Meanwhile, the risks that can occur in pregnant women are bleeding, anemia, infectious diseases and the mother does not gain weight. In addition, the impact that can occur on the fetus includes inhibition of fetal growth and development, miscarriage, stillbirth (IUFD), congenital defects, low birth weight babies (LBW), affecting children's intelligence to be less, prematurity, and infant mortality.<sup>12</sup>.

Based on the results showed that the distribution of respondents based on birth weight can be interpreted that there are no babies with low birth weight (<2500) in both intervention groups and control groups. As for the normal newborn weight (2500 grams) in the intervention group as many as 30 babies (100%) and in the control group also as many as 31 babies (100%) so that there is no difference between the two groups that is meaningful. The results of statistical tests using the *chi-square* test obtained a *p value = constant*). From the data on differences based on birth weight in the intervention group and control group, the mean value is greater than the control group.

Normal newborns are babies who are born in the presentation of the back of the head through the vagina without using tools, at an even gestational age of 37 weeks to 42 weeks, with a body weight of 2500-4000 grams. Age of birth affects the growth of baby weight, because in babies born with mature birth age, the organs in the baby's body are more mature. The baby's weight growth at the age of 0-6 months will increase every week by about 140-200 grams and the weight will be twice the birth weight at the end of the sixth month.<sup>13</sup>. Body weight and body length are related to the baby's nutritional status. The impact caused if the baby experiences a lack of nutritional status is that the baby will experience growth delays.<sup>14</sup>.

Birth length is a measure of the length of the baby that is done on the back when the baby is born. The length of the baby's body at birth describes the linear growth experienced by the baby while in the womb.<sup>15</sup>. Short size usually indicates a state of malnutrition due to lack of energy and protein suffered in the past which is preceded by a slowdown in fetal growth.<sup>16</sup>. Inadequate maternal nutritional intake before pregnancy causes growth disorders in the fetus so that it can cause babies to

be born with short birth length. Babies who are born have a normal body length when the baby's body length is 48-52 cm long.<sup>17</sup>.

Based on the results of the study, it shows that the distribution of respondents based on birth length can be interpreted that the intervention group respondents have an average newborn body length that is categorized as normal, namely 28 babies (93.3%), short as many as 2 (6.7%) while the control group is normal as many as 27 (87.1%), short as many as 4 (12.9%) From the data on differences based on the length of the newborn's body, it is found that there is an increase. The increase in newborn body length in the intervention group of 49.47 cm was better than the control group of 48.55 cm. statistically obtained *p value* 0.918 for both groups, both groups were given pumpkin seed capsules or blood supplement tablets.

This proves that giving pumpkin seed capsules to pregnant women can increase the weight and length of normal newborns. This is because pumpkin seed capsules contain many benefits for consumption by pregnant women. Where pumpkin seeds contain alkanoid compounds, saponins, kukurbitasin, lecithin, resin, stearin, phytosterol compounds, phenolics, fatty acids, squalen, tyrosol, nailic acid, vanillin, luteolin, and sinapat acid, vitamins (including vitamin  $\beta$ -carotene, vitamin A, vitamin B2, vitamin C and vitamin E).<sup>18</sup>.

## **CONCLUSION**

1. There was a difference in the increase in newborn weight and length between the group of pregnant women who took pumpkin seed capsules (intervention group) and pregnant women who took blood supplement tablets (control group).

## **ADVICE**

1. For pregnant women, pumpkin seed capsules can be an alternative supplement given the more comprehensive content of pumpkin seed capsules, so it is expected to improve the nutritional status and health of pregnant women.
2. It is important to educate pregnant women to consume nutrient-rich foods.

## **LIMITATIONS OF THE STUDY**

1. The intervention phase in this study took place from February to April 2023. It should be noted that March to April is the month of Ramadan, which may affect the eating habits of respondents due to eating patterns and times.
2. Furthermore, the statistical data showed that prior to the intervention, there were inequalities (non-homogeneous) in the intervention group and control group regarding the age of



pregnancy in trimester 1 and trimester 2. These inequalities may affect the study results and data interpretation. Further efforts are needed to control for factors that may affect the results of the study.

3. Measurement of fetal weight during pregnancy is not done so it is difficult to know the growth of the fetus each month.
4. Researchers were also assisted by midwives from the health center and hospital to measure the weight and length of newborns.

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