



Effect of Yellow Pumpkin Seed Capsules (*Cucurbita Moschata*) And Education on Body Weight and Compliance of Pregnant Women with Chronic Energy Deficiency in the Bone District

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ABSTRACT:

Introduction Chronic Energy Deficiency (CED) occurs in pregnant women with anthropometric examination results indicating an Upper Arm Circumference (MUAC) <23.5cm. This condition is a consequence of prolonged inadequate food intake. Pumpkin seeds are a powerhouse of essential macro and micronutrients, making them an ideal resource to address the nutritional requirements of pregnant women.

Objectives: This study aim the effect of administering pumpkin seed capsules on body weight, compliance level, and preference level in pregnant women experiencing CED.

Methods: The study utilized a quasi-experimental design with a non-randomized pre-posttest approach conducted at two Community Health Centers in Bone Regency. The intervention group, consisting of 30 respondents, received 700 mg pumpkin seed capsules at two tablets per day at Watampone Community Health Center. The control group, comprising 31 respondents, received Iron Folic Acid (IFA) tablets at Biru Community Health Center, and they were to take one tablet daily. Both groups underwent the intervention for 60 days. The research employed Wilcoxon and Mann-Whitney tests for analysis.

Results: The study findings revealed that gestational age was more prevalent in the 2nd trimester. After the treatment, a significant change in the weight of pregnant women was observed in both the intervention group ($p=0.001$) and the control group ($p=0.001$). It was evident that all participants adhered to the consumption of pumpkin seed capsules and IFA tablets. Moreover, based on color and texture, pregnant women strongly preferred IFA, while they favored pumpkin seed capsules in terms of aroma and taste.

Conclusions: Both the intervention and control groups experienced significant changes in body weight. Participants diligently followed their prescribed consumption of pumpkin seed capsules and IFA tablets.

1. Introduction

In the 2015-2019 period, the health development initiatives centered on four crucial programs: diminishing maternal and infant mortality rates, lowering the prevalence of stunting, combating infectious diseases, and addressing non-communicable diseases [1]. [2] reported that a staggering 73.2% of pregnant women, totaling 629 thousand, suffered from Chronic Energy Deficiency (CED).

Shockingly, pregnant women with CED face a 20-fold increase in the risk of death compared to those with normal Upper Arm Circumference (MUAC) >23.5 cm.

According to the Indonesian Basic Health Research 2018, 17.3% of pregnant women in Indonesia suffered CED. The data also revealed that 86.4% of CED pregnant women received complementary feeding, surpassing the 80% target. Despite this, the figure did not meet the 2019 target of 95%



[3]. The province of South Sulawesi, particularly Bone Regency, is grappling with considerable health issues. Data from 2019 revealed that 2,247 pregnant women (15.03%) in the area suffered from CED (Dinkes Bone, 2021).

To support pregnant women in CED, the government is taking steps to provide complementary feeding in

biscuits. Pregnant women must consume these biscuits daily for 90 days to enhance their calorie and protein intake [4]. Furthermore, the government also offers a vital program to supply iron and folic acid (IFA), essential for addressing complications in pregnant women. A study by [5] found that pregnant women who adhere to complementary feeding can significantly increase their weight gain. Additionally, research by [6] demonstrates that education plays a crucial role in improving compliance among pregnant women about using IFA tablets.

In addressing weight gain among pregnant women in CED, it is imperative to go beyond the established government approaches of IFA and commercial feeding. We must renew our commitment to implementing research and developing effective interventions. One promising avenue is incorporating underutilized local functional foods such as pumpkin, which thrives in Indonesia [7]. Pumpkin seeds are rich in zinc, a mineral that can boost appetite, increase energy intake, and enhance fat-free mass in the body (Hidayati, 2019). A 100-gram serving of pumpkin seeds contains 6.5 mg of zinc minerals and vitamin B (Widowati et al., 2008). Research by [8] indicates that vitamin B can effectively increase appetite and prevent nausea and vomiting during pregnancy. Providing multi-micronutrients can significantly improve the nutritional status of pregnant women.

2. Objectives

This study aimed to evaluate the impact of administering capsules made from yellow pumpkin seeds (*Cucurbita moschata*) and providing education on the body weight and compliance of pregnant women with CED.

3. Methods

The Faculty of Public Health at Hasanunuddin University of Makassar officially approved this research, bearing ethical number 121023042237. This study conducted in Bone Regency using a quasi-experimental design to compare the effects of pumpkin seed capsules and IFA tablets on pregnant women with Chronic Energy Deficiency. Participants were 61 pregnant women divided between

Watampone Community Health Center (intervention group, n=30) and Biru Community Health Center (control group, n=31). Using a hypothesis test formula for two proportions, the intervention group received 700 mg of pumpkin seed capsules twice daily, while the control group took IFA tablets with iron and folic acid for 60 days.

In this groundbreaking research, we provided vital education to pregnant women suffering from chronic energy deficiency using informative leaflets. The purpose was to enlighten the intervention and control groups about the invaluable benefits of pumpkin seed capsules and IFA. Additionally, we aimed to raise awareness about the dangers of chronic energy deficiency in pregnant women and its profound impact on both the mother and fetus. These impactful education sessions thrice a month, ensuring that crucial information was effectively delivered and comprehensively understood.

We prioritize quality control by standardizing instruments and calibrating anthropometric tools to guarantee precise measurement results. To ensure adherence to instructions, we conduct field control by maintaining daily communication via a dedicated WhatsApp group and scheduling face-to-face meetings with respondents once every two weeks.

The research data were analyzed using the SPSS 28 application for Windows. The robust Wilcoxon test was used to measure the intervention's impact on both groups pre-post-intervention. In contrast, the Mann-Whitney test effectively compared the disparities between the intervention and control groups. All statistical outcomes were considered significant at a p-value of less than 0.05.

4. Results

The study findings revealed that the vast majority of participants in both the intervention and control groups, 90% and 90.3%, respectively, were not at risk and fell within the 20-35 age range. Moreover, significant proportions of CED pregnant women in both groups were unemployed or housewives, accounting for 54.8% and 73.3%, respectively. Additionally, the study highlighted that primiparous mothers constituted the majority in both the intervention (60%) and control (54.8%) groups. Furthermore, the maximum gestational age was observed in the second month of pregnancy for 90% of the intervention group and 64.5% of the control group. The statistical tests indicated homogeneity in age, employment status, and parity between the two groups (Table 1).



Variable	Intervention		Group control		P Value*
	n (30)	%	n (31)	%	
Age (Year)					0,65
<20 or >35	3	10	3	9,7	4
20-35	27	90	28	90,3	
Job status					0,13
Work	8	26,7	14	45,2	3
Not working/homework	22	73,3	17	54,8	
Parity					0,68
Primigravida	18	60	17	54,8	4
Multigravida	12	40	14	45,2	
Gestational Age					0,01
Trimester 1	3	10	11	35,4	8
Trimester 2	27	90	20	64,5	

Source: Primery data, 2023

Table 2 indicates remarkable changes in the average weight of pregnant women with CED following the intervention and control group treatments. After receiving pumpkin seed capsules and education, the intervention group saw an average weight increase of 3.25 kg. In comparison, the control group increased by 1.3 kg following IFA tablets and education. These outcomes are statistically significant ($p=0.000$), proving the effectiveness of both treatments. A comparison of pre-test and post-test results between groups also highlights the significant weight impact of the interventions, suggesting their potential to help pregnant women with chronic energy deficiency.

Pregnant women's weight	Before (Mean \pm SD)	After (Mean \pm SD)	P Value ^a	Difference (Mean \pm SD)
Intervention (n=30)	46,58 \pm 4,04	49,83 \pm 3,94	0,00	3,25 \pm -0,1
Control (n=31)	44,76 \pm 2,29	46,06 \pm 2,61	0,00	1,3 \pm 0,32
P Value^b	0,58	0,000		0,684

Source: Primery, 2023

^aWilcoxon ^bMan-Whitney

A study compared two groups, one consuming pumpkin seed capsules and the other taking IFA tablets. The study observed differences in color, aroma, taste, and texture preferences. The group that consumed pumpkin seed capsules had lower color but higher aroma and taste ratings compared to the group taking IFA tablets. However, the group taking IFA tablets had a higher texture rating. Statistical tests revealed significant differences in all attributes except color, with lower significance ($p=0.014$). Despite these differences, pregnant women with chronic energy deficiency equally preferred both groups across all attributes (Table 3).

Variable	Pumpkin seed capsules (Mean \pm SD)	TTD (Mean \pm SD)	P-value
Color	3,47 \pm 0,50	3,77 \pm 0,42	0,014
Aroma	4,03 \pm 0,32	2,90 \pm 0,59	0,00
Flavor	4,07 \pm 0,45	3,00 \pm 0,51	0,00
Texture	3,33 \pm 0,47	3,84 \pm 0,52	0,00

*Mann-Whitney Test

5. Discussion

Age significantly impacts health outcomes in pregnancy, with women <20 and >35 at greater risk for complications. Research highlighted that those aged 20

to 35 were less likely to experience CED, a condition also influenced by nutritional knowledge, pregnancy spacing, and economic status. Women outside this age range were found to



be 13.5 times more at risk for CED [9] The employment status of pregnant women significantly impacts the occurrence of CED. Through research, it has been found that the majority of pregnant women affected by CED fall into the "not working" or "housewife" category. This highlights the heightened risk faced by housewives due to their extensive household responsibilities [10].

Parity links a woman's status and the number of children she bears. Pregnancy risks include multiparity, which can impact the mother and fetus. This study's parity data reveals that most CED pregnant women are primigravida, aligning with research showing a connection between primigravida pregnancies and maternal CED incidence [11]. The study focused on pregnant women in their second trimester, emphasizing that energy needs slightly rise in the first three months and continue increasing as pregnancy progresses. This is attributed to the extra energy required for growing maternal tissues, including blood volume, uterine and breast growth, and fat storage [12].

The study results revealed that pregnant women in both the intervention and control groups experienced a significant increase in body weight. In the intervention group, pregnant women with chronic energy deficiency showed an average weight gain from 46.58 kg to 49.83 kg after receiving pumpkin seed capsules and education, indicating a notable 3.25 kg increase ($p = 0.000$, where $p < 0.05$). Similarly, in the control group, the average weight increased from 44.76 kg to 46.06 kg after receiving IFA tablets and education, demonstrating a significant increase of 1.3 kg ($p = 0.000$, where $p < 0.05$). These findings substantiate a previous study which reported significant improvements in body weight after administering pumpkin seed biscuits to pregnant women ($P = 0.000$) [13].

The success of this research is directly linked to the 100% compliance of all respondents in consuming pumpkin seed capsules and IFA tablets. Both groups demonstrated strong adherence to these treatments. A study by [14] emphasized that educating and regularly monitoring pregnant women can significantly enhance compliance. Compliance is the ultimate result of behavioral change, beginning with increased knowledge. When individuals acquire substantial knowledge, their attitudes change, leading to behavioral adjustments. Prior to changing their behavior, individuals carefully consider the benefits they stand to gain [15].

6. Conclusions:

The study revealed that pumpkin seed capsules, compared to IFA, had a significantly different impact on the weight of pregnant women with CED. While both groups fully adhered

to the protocols, individual preferences varied, with participants favoring IFA for its color and texture and preference for pumpkin seeds due to their aroma and taste. As a result of these findings, the study advocates for considering pumpkin seed capsules as a superior nutritional choice for pregnant women. Furthermore, it strongly recommends further exploration of interventions involving pumpkin seeds and the incorporation of pumpkin seed capsules as a complement to IFA and complementary feeding programs for malnourished pregnant women.

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