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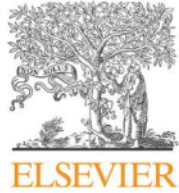
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Affect of moringa oleifera given against pregnant and breastfeeding mothers cortisol⁶



Suhartatik^{a,*}, Veni Hadju^b, Masyita Muis^c, Hasanuddin Ishak^d

^a Instructor, Poltekkes Kemenkes Makassar, Indonesia

^b Department of Nutrition, Faculty of Public Health, Hasanuddin University, Indonesia

^c Department of Occupational Health and Safety, Public Health Faculty of Hasanuddin University, Indonesia

^d Department of Environmental Health, Public Health Faculty of Hasanuddin University, Indonesia

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KEYWORDS

Moringa oleifera;
Cortisol;
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Abstract

Objective: This study to assess the affect of moringa oleifera given against pregnant and breastfeeding mothers cortisol.

Method: Sample 40 pregnant women, low education, no work statusin, the experimental method (Randomized Double Blind design), Saliva samples from nursing mothers tested by Laboratory using KIT ELISA.

Results: Pre cortisol in the iron tablet and Moringa flour group was $p = 0.0003$, post pregnancy cortisol results in the iron group and Moringa flour, $p = 0.11$ decrement greater in the group with Moringa flour \pm SD $2.91 \pm 7:20$, group of iron \pm SD $3.60 \pm 6:37$, based on test of both groups the presence of the value $p = 0.006$, at 3 months of age, $p = 0.923$ ($p > 0.05$) at 6 months of age $p = 0.496$ ($p > 0.05$), a greater decrease occurred in the Moringa flour group with a value of \pm SD = 5.44 16.77 , based on test of both groups the presence of the value p ($p = 0.359$).

Conclusion: Moringa flour provides the same benefits as Fe against cortisol levels during pregnancy but not significant at the lactation.

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Introduction

Growth problems (short toddlers or stunting) are a major problem in the world at an early age. Globally, about 151 million children under five suffer from stunting in 2017.¹ Prevalensi toddler stunting in Indonesia in 2005---2017 was 36.4% of the 83.6 million children under five stunting in Asia.

⁶ Peer-review under responsibility of the scientific committee of the 1st International Conference on Nutrition and Public Health (ICNPH 2019). Full-text and the content of it is under responsibility of authors of the article.

* Corresponding author.

E-mail address: suhartatik2212@gmail.com (Suhartatik).

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Based on Nutritional Status Monitoring data; The prevalence of very short and short toddlers aged 0---59 months in Indonesia in 2017 is 9.8% and 19.8%. The province of South Sulawesi has a stunting incidence rate that is higher than the national figure. National surveys in 2010 and 2013 showed stunting 44.7% and 44.9%.²

Problems stunting is a intergenerational nutrition problems. Contributing factors include poor maternal nutritional status, infectious disease, breastfeeding. Inappropriate nutritional intake will also cause children to experience malnutrition which ultimately increases the incidence of morbidity and mortality. Job stress in pregnant women will have an impact on pregnancy and the fetus it contains such as miscarriage, preterm labor, preterm birth and low birth weight. Job stress causes the release of stress hormones which results in increased micronutrient requirements so that pregnant women need more intake. The impact on increasing cortisol in early pregnancy is associated with slow progression during postnatal.

The multi-sectoral manner to assist in the handling of stunting. One of the highlights is research nutritional problems using Moringa oleifera. Moringa oleifera has been used to combat malnutrition, especially in infants and nursing mothers.³ Moringa oleifera increases the weight of pregnant women, decreases stress, decreases gene damage, and increases baby birth weight.⁴ Giving moringa oleifera extract² and moringa oleifera can increase the volume of ASI.⁵ Moringa oleifera can increase antioxidant levels and reduce MDA, and 8-OHdG. Referring to the above background¹ see conditions occur, it is necessary to do research on "Affect of Moringa Oleifera Given against pregnant and breastfeeding mothers cortisol".

Method

The type of research used was experimental research with a Randomized Double Blind design, Controlled design. With this design the researcher measured the effect of treatment (intervention) on the experimental group by comparing the group with the control group. Subjects in this study were divided into 2 study groups randomly where one group would receive moringa oleifera flour capsules, the second group² received a capsule containing iron folate. This research is part of intervention research that began in 2018.

Research was conducted in the working area of the Tamalate health center in Jeneponto district, South Sulawesi. The population; group of pregnant and lactating women, Sampel research; third trimester pregnant women, low education category (69.4%), women with no work status (91.7%), aged > 20 years < 40 years, did not consume multivitamin² and minerals during the study). The sample size follows the number of samples followed since pregnant women, namely 20 pregnant women per group. At birth, the number of infants can be followed by 40 with the assessment of the first group receiving capsules of moringa flour oleifera ($n = 20$), the second group is pregnant women who receive iron folate capsules ($n = 20$).

Provision of interventions; Provision of Moringa leaf flour is Moringa leaves processed into flour and packaged in capsule form. Moringa leaf flour capsules are distributed to correspondents every week and monitored using a control

sheet. Consumed at a dose of 2 x 1000 mg (morning, and before going to bed at night) in a day for 90 days in the intervention group. Every week the Midwife will make a home visit to control the mother who receives Moringa leaf flour capsules. After 90 days are completed in months 3 and 6, sample of saliva (saliva) to check the levels of the hormone cortisol (post test) and breast milk of the mother around 10 cc. Recording in this study took the form of monitoring the administration of capsules taken for a month.

Primary data consists of directly measuring the nutritional status of pregnant and lactating women, the side effects of giving the product, the weight and height of the baby. Before giving moringa leaf flour therapy, the researchers measured the levels of the hormone cortisol (stress hormone) through saliva (saliva). Before taking saliva samples it was hoped that mothers would not consume anything either food or drink and not brush their teeth 30 min before saliva collection and sampling we do it in the morning between 07.00 and 08.00 so that the substances contained in the mother's saliva don't change. Secondary data in the form of target reports for the MCH program were obtained from the Jeneponto district health office.

Data analysis includes: Paired *T*-Test, used to analyze data on differences in the average of two interconnected values, namely data on nutritional intake, consumption patterns, weight, and height before and after intervention in each group. Independent *T*-Test to analyze data on differences in average weight gain, consumption patterns, nutritional supplements, and infant height in the intervention and control groups. Multivariate analysis, for controlling confounding variables. Uji using enzyme linked immunosorbent assay ELISA KIT Test Using Lab, Lab results expressed in units of mg/L. Ethical issues faced by the subject (patients feel uncomfortable because the capsules given have characteristic odor and the capsule size is somewhat larger than the size of the iron).

2 Results

Data shows that the characteristics based on (Maternal Age, Education, Maternal Occupation, Home Smoking, Child Gender² Breastfeeding, Breastfeeding Pattern).

Table 1 shows a description of the respondents were mothers with age ≥ 26 years with a total of 24 people (66.7%), had low category education with 25 people (69.4%), mothers with unemployed status 33 people (91.7%), there were people who smoked at home with 29 (80.6%) and still found MP-ASI < 6 months 5 people (13.9%).

Table 2 shows that pre¹ant cortisol pre in the intervention group of iron tablets and moringa flour was $p = 0.003$, then post pregnancy cortisol results in the iron group and Moringa flour i.e. $p = 0.119$, included the results of the value Δ Mean \pm SD of both the iron intervention group and Moringa flour namely ($p = 0.006$).

Table 3 shows the results of the statistical test showed that there was no difference in cortisol hormone levels in the iron intervention group and Moringa flour at 3 months of age, $p = 0.923$ ($p > 0.05$) as well as at 6 months of age $p = 0.496$ ($p > 0.05$) concluded the results of Δ Mean \pm SD from both iron intervention and Moringa flour groups ($p = 0.359$).

Table 1 Characteristics of respondents.

Variable	Iron tablet		Moringa capsules		Total		p value
	n	%	n	%	N	%	
Mother's age							
<26 years	5	27.8	7	38.9	12	33.3	0.728
≥26 years	13	72.2	11	61.1	24	66.7	
Education							
Low < 12 years (elementary or non-primary)	11	61.1	14	77.8	25	69.4	0.469
Height ≥ 12 years (SMP, SMA and PT)	7	38.9	4	22.2	11	30.6	
Mother's job							
Does not work	17	94.4	16	88.9	33	91.7	1.000
Work	1	5.6	2	11.1	3	8.3	
Smoking in the house							
Yes	14	77.8	15	83.3	29	80.6	1.000
Not	4	22.2	3	16.7	7	19.4	
Child gender							
Man	9	50.0	11	61.1	20	55.6	0.737
women	9	50.0	7	38.9	16	44.4	
MP-ASI							
<6 months	4	22.2	1	5.6	5	13.9	0.338
≥6 months	14	77.8	17	94.4	31	86.1	

Table 2 The results of the analysis of differences in pregnant (Pre) and (Post) cortisol hormones in the intervention group of iron tablets and Moringa flour.

Intervention group	Pregnant cortisol (PRE) Mean ± SD	Pregnant cortisol (POST) Mean ± SD	Δ Mean ± SD
Iron Tablets (n = 19)	18.53 ± 3.66	22.13 ± 5.67	↑ 3.60 ± 6.37
Moringa flour (n = 19)	22.45 ± 3.95	19.54 ± 4.17	↓ 2.91 ± 7.20
p-Value	0.003	0.119	0.006

Table 3 The results of the analysis of 3 months and 6 months cortisol hormone differences in the iron tablets and Moringa flour intervention group.

Intervention group	3 months cortisol Mean ± SD	6 months cortisol Mean ± SD	Δ Mean ± SD
Iron tablets (n = 19)	25.19 ± 15.33	23.74 ± 14.46	↑ 1.45 ± 18.15
Moringa flour (n = 19)	25.71 ± 16.34	20.27 ± 15.56	↓ 5.44 ± 16.77
p-Value	0.923	0.496	0.359

Discussion

Based on the results of the study on the pregnancy stage, there is an influence, this is related to previous studies that maternal cortisol (anxiety) specifically in pregnancy has an effect on the fetal development program. Research studies⁶ mention the influence of maternal perinatal distress on preterm birth, infant health and development. The impact on increased cortisol in pregnancy is associated with slow progression during postnatal. Increased special anxiety levels early in pregnancy are independently associated with mental development, can be caused

by maternal postpartum, stress related to maternal psychology, care, prenatal medical history, socioeconomic factors or race, gender, birth order.⁷ Cortisol is a type of steroid hormone that influences how the body responds to stress, Cortisol is a hormone produced in the adrenal glands. Cortisol will then be released into the blood and flowed throughout the body. Cortisol production is controlled by three organs in the body: the hypothalamus in the brain, the pituitary gland, and the adrenal gland. When cortisol levels in the blood decrease, the three organs will work together to trigger cortisol production.

Normal levels of cortisol in pregnant women is very important because the process of growth and development of fetal brain is strongly influenced by the response of the mother during pregnancy. The increase in cortisol in early pregnancy is related to the slow development of the fetus, so it is very important that education on stress factors can be sourced from internal maternal and environmental conditions, in line with research studies⁶ maternal distress affects preterm birth, infant health and development. Anxiety during pregnancy in primiparous mothers will burden the condition of babies in their births because psychologically they are not ready and the reproductive organs are not perfect, which can increase the risk of labor and is one of the factors causing maternal death, long-term delivery babies, LBW, postpartum depression, etc. Research studies⁸ state that the use of plasma cortisol to measure psychophysiological stress in humans is very broad, but in the birth period the use of cortisol as a stress biomarker is very complicated. Plasma cortisol levels increase during labor.

Related results intervensi Moringa powder supplementation and Fe at the time pregnant women in observasi until months 3 and 6 not future breastfeeding mothers found to influence. When the mother is breastfeeding, the metabolic process is aided by lactation, so the hormone cortisol can be in normal fat. In line with the research study⁹ mentioning the process of basal secretion and stress activities induced from the hypothalamus---pituitary---adrenal (HPA), the exact and stable physiological demands of the mother are one of the important factors for development and good offspring. Sharpley et al. (2010) mention the pattern of secretion of differences in cortisol concentration from women can be seen in hair and saliva during the 15-h period.¹⁰ Moringa oleifera leaves plants contain nutrients as well as antioxidants, which prevent oxidative damage and provide significant protection against oxidative damage.

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Conclusion

Moringa flour provides the same benefits as iron or iron to cortisol levels during pregnancy but not significantly in breastfeeding. As a recommendation to research selanjutnya do research related to the amount of sample is larger and interventions can be done also at the time of breast-feeding

mothers, and pay attention to other factors deeply related to environmental sanitation effect on morbidity.

Conflict of interest

The authors declare no conflict of interest.

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