



The Influence Provision of Moringa Leaf Exctracy (Moringa Oliefera) against the Level of Mda (Malondialdehyde) in Pregnant Women

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Abstract

When pregnancy is prone to oxidative stress and require additional antioxidants. Moringa leaf extract contains a number of antioxidants that can meet the needs of pregnant women. The aim of this study is to determine the influence provision of moringa leaf extract against to level of pregnant women MDA. The design uses a Randomized Double Blind, Posttest controled with samples of non-anemic pregnant women. Samples were divided into two groups: Moringa leaf extract and controls who received iron supplements of folic acid. The Interventions was conducted over twelve weeks. Before and after the intervention was measured MDA in both study groups. MDA measurement is done through urine using Elisa method. Result indicated that MDA comparison between the intervention group before and after intervention were 7.82 ± 1.22 vs 8.34 ± 1.70 nmol / g, while the control group were 7.42 ± 0.92 vs 8.96 ± 1.90 . The mean increase in MDA intervention group at 0.55 ± 1.57 nmol / g ($p = 0.364$), whereas in the group of 1.54 ± 1.84 nmol / g ($p = 0.010$). Increased levels of MDA in the control group was higher than the intervention group ($p = 0.033$). In conclusion, provision of Moringa leaf extract can inhibit the increase in MDA levels in pregnant women.

Keywords: Moringa leafs; Malondialdehyde; pregnant women.

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1. Introduction

Pregnancy is an inflammatory condition that shows high against the fragile nature of oxidative stress [1]. The process of pregnancy causes an increase in oxidative stress leading to the increase on the results of oxidation, such as malondialdehyde (MDA). Patil, et al found that MDA levels in pregnant women is higher than normal women (not pregnant). The level of MDA in pregnant women is higher than non-pregnant women.

Increased levels of MDA increased with gestational age, ie from the first trimester, second, and third [2,3]. Increased MDA as a sign of oxidative stress may result in DNA damage, disorders of pregnancy such as preeclampsia (PE) and fetal growth restriction or intrauterine growth restriction / IUGR [4].

On the other hand, the levels of antioxidants both enzymatic and non-enzymatic decreased in pregnant women. SOD, GSHPx, and Catalase lower in pregnant women compared with non-pregnant women, and continues to decrease with the increase of gestational age [5]. High antioxidant status is usually followed by a decrease of MDA [6].

Moringa leaf has the potential large enough nutrients, it contains a number of essential amino acids, and a wide range of essential micronutrients, such as vitamin A, vitamin C, vitamin E, iron in high enough quantities [7], [8]. Moringa leaf contains a number of high antioxidant vitamins, namely vitamin A is higher than carrots and more vitamin C than citrus fruits [9]. Vitamin A, vitamin C and vitamin E were an antioxidant that is important for the producer of the body [10].

Several studies have reported on the benefits of Moringa leaf extract on the prevention of anemia and genomic health and nutritional status of pregnant women. Anang et al (2014) reported that Moringa leaf extract can reduce levels of 8-OHdG as a marker of DNA damage in pregnant women in the district of Gowa, South Sulawesi [11]. The intervention of Moringa leaf extract in addition to preventing damage to DNA, also can prevent anemia and improve the nutritional status of non-pregnant women who work as informal workers in Makassar [12].

This paper describes the results of study on the effect provisions of Moringa leaf extract on levels of Malondialdehyde (MDA) of pregnant women in Makassar, Indonesia.

2. Materials and Method

2.1. Type and design of the study

This study will be carried out through an experimental by intervention Moringa extract in pregnant women. The study design was using Randomized Double Blind, Pretest-Posttest controlled. Double blind. Pregnant women who meet the criteria inkulusif divided into two groups randomly (simple random sampling).

The first group received Moringa leaf extract and the second group will receive iron supplementation of folate (60 mg Fe and 400 mg folate). The interventions was conducted approximately three (3) months.

2.2. Population and sample

The study population was all pregnant women who are in the coastal area of Makassar. The coastal area in Makassar found in five districts, namely Sub District of Ujung Tanah, Tallo, Biringkanaya, Mariso and Tamalate.

Samples were second trimester pregnant women in some areas of the health center in the coastal city of Makassar. Sample selection was conducted by using the inclusive criteria as follows: 5-6 months gestation and had higher levels of Hb (hemoglobin) were normal (> 10.5 g / dL).

2.3. The techniques of data collection

The data collected in this study include MDA levels were assessed by MDA levels in the urine using the Elisa method. Data of family social economic was collected by interviewing,

2.4. Processing and analyzing data

The data were analyzed using univariate and bivariate. Univariate analysis done by reviewing the value of the average (mean) and standard deviation (SD) of MDA in both treatment groups. The bivariate analysis was done by comparing the mean MDA between treatment groups using two-sample t test is free, and two-sample t test related to test MDA levels between before and after the intervention in each group.

2.5. Ethical Clearance

This study was conducted after obtaining approval from the Committee Ethics of Health Study , Faculty of Medicine, University of Hasanuddin Makassar . Prior to the measurements and interviews given an explanation about the actions to be taken to each respondent (breastfeeding). After the explanation, the respondents were asked to consent to participate in the study by signing the informed consent.

3. Result

3.1. The situation of family social economy

Table 1 shows the education level of the respondent and their husband mostly only finished elementary school and junior high school. Most respondents have a husband who works as a daily worker.

The number of family members of respondents generally around 4-5 people. The results of statistical analysis showed there are no difference in the distribution of the respondents' education levels, level of husband education, husband's occupation and the size of family members among study groups.

3.2. Smoking habit

Table 2 shows the expectant mothers in both groups of this study have more family members who smoke (81.4%). Mostly among family members who smoked had a smoking habit at the home (75.9%).

Table 1: The situation of family social economy

Family Social condition	Intervention		Control		Total		P value
	n=35	%	n=35	%	n=70	%	
Husband education							
Uneducated	1	2.9	1	2.9	2	2.9	0.436
Educated of Elementary School	15	42.9	8	22.9	23	32.9	
Educated of Junior High School	10	28.6	12	34.3	22	31.4	
Educated of Senior High School	8	22.9	11	31.4	19	27.1	
University	1	2.9	3	8.6	4	5.7	
Wife education							
Uneducated	1	2.9	1	2.9	2	2.9	0.471
Educated of Elementary School	13	37.1	8	22.9	21	30.0	
Educated of Junior High School	12	34.3	13	37.1	25	35.7	
Educated of Senior High School	8	22.9	8	22.9	16	22.9	
University	1	2.9	5	14.3	6	8.6	
Husband occupation							
Fisherman	1	2.9	4	11.4	5	7.1	0.114
Private employees	2	5.7	5	14.3	7	10.0	
Entrepreneur	14	40.0	7	20.0	21	30.0	
Daily worker	18	51.4	17	48.6	35	50.0	
Other	0	0	2	5.7	2	2.9	
The size of families							
< 3 people	5	14.3	9	25.7	14	20.0	0.127
4-5 people	17	48.6	17	48.6	34	48.6	
6-7 people	11	31.4	4	11.4	15	21.4	
>6 people	2	5.7	5	14.3	7	10.0	

Table 2: The smoking habit in the family

Smoking habit	Intervention		Control		Total		P value
	n	%	n	%	n	%	
Member of family skome							
Yes	31	88.6	26	74.3	57	81.4	0.219
No	4	11.4	9	25.7	13	18.6	
Smoking at the home							
Yes	26	83.9	18	66.7	44	75.9	0.223
No	5	16.1	9	33.3	14	24.1	
Passive smoker							
Yes	15	48.4	11	40.7	26	44.8	0.749
No	16	51.6	16	59.3	32	55.2	

The number of family members who smoked did not differ significantly between groups ($p > 0.05$), although the number of family members who smoke in the home more in the intervention group, but the difference was not statistically significant ($p > 0.05$).

3.3. Level of malondialdehyde

Table 3 shows the levels of Malondialdehyde (MDA) urine of pregnant women has increased in both study groups. The result of statistical analysis showed there are significant difference of MDA urine of pregnant women between before after supplementation with either the intervention group ($p = 0.031$) or the control group ($p = 0.000$). The increased of MDA of urine is greater in the intervention group compared to the intervention group. The control group experienced an increase in MDA approximately 7.03%, while the control group the increase reached 20.75%. The results of statistical analysis in Table 18 showed there are significant difference between the change in urinary MDA intervention group and control group. The level of MDA in the control group experienced a greater increase than the intervention group.

Table 3: The comparison MDA level before and after intervention at every group supplementation.

Groups	Before	After(nmol/g)	p ¹	Changes*)	
	(nmol/g)			X ± SD	p ²
intervention	7.82±1.22	8.34±1.70	0.031	0.55±1.57	0.011
control	7.42±0.92	8.96±1.90	0.000	1.54±1.84	

¹ Wilcoxon

² Mann-U Whitney

*)The changes of MDa level before and after intervention

4. Discussion

The malondialdehyde (MDA) is a parameter that used to determine the oxidative stress. MDA is the end product of lipid peroxidation in the body, has a three-carbon chain (C₃H₄O₂) [13]. The results of this study found average levels of MDA both pregnant women in the intervention group were consuming Moringa leaf extract or the control group who consumed iron folic acid supplements still increasing.

MDA levels in the intervention group before and after each intervention 1.22 ± 7.82 nmol / ml and 8.34 ± 1.70 nmol / ml. The control group had a mean of MDA between before and after intervention respectively 7.42 ± 0.92 nmol / ml and 8.96 ± 1.90 nmol / ml. Increased levels of MDA was higher in the control group of pregnant women (1.54 ± 1.84 nmol / mL), whereas in the group of pregnant women who consume Moringa leaf extract supplements increase amounted to only 0.55 ± 1.57 nmol / mL. These results indicate that administration of Moringa leaf extract, especially at the end of the trimester of pregnancy may prevent or inhibit the formation of free radical reactions that trigger peroxidation lipid where the characterized by a lack of formation of MDA in the group of pregnant women who consume Moringa leaf extract.

Markers of oxidative stress in this study were found to have significantly increased. MDA levels of pregnant women increased significantly in both groups, but a higher increase was found in the control group who received iron supplements of folic acid. MDA levels in the control group increased by 11.81% compared to the situation before taking iron folic acid, while the intervention group the increase was only 3.25%. The results of this study showed that administration of Moringa leaf extract for three months has not been able to reduce levels of MDA at the end of pregnancy. However, the provision of Moringa leaf extract is considered to inhibit the reaction of free radical formation and oxidation of several molecules such as fats and proteins.

Although MDA pregnant women in this study have increased but the final value is within normal limits. MDA normal pregnant women (without diabetes or preeclampsia) at 7.08 ± 1.20 nmol / g. Pregnant women who have higher levels of MDA which is a sign of disorders of pregnancy complications such as preeclampsia [14].

Moringa leaf extract inhibits the formation of MDA produced in the liver. Decreased levels of MDA in the extract of leafs of Moringa leaf extract showed their role as antioxidants [15]. Pregnant women who consume Moringa leaf extract supplements have higher levels of antioxidants than pregnant women who consumed only iron folate supplements [16].

Herbal ingredients like moringa leafs contain compounds such as polyphenols, flavonoids and phenols which become antioxidant components as free radical scavengers. According to Winarti (2010), Moringa leafs contain a number of high antioxidant vitamins, namely vitamins A higher than carrots and more vitamin C than citrus fruits [9].

Moringa leafs contain a number of vitamins and minerals that contain non-enzymatic antioxidants such as vitamin A (beta carotene), vitamin C and vitamin E. Vitamin C is a chain-breaking antioxidant that can stop the propagation of peroxidation. Vitamin C also can help cycle of oxidation of vitamin E and glutathione. Antioxidants are both non-enzymatic and enzymatic role against toxic effects of lipid peroxidation and oxygen

radicals and simultaneously reduces the amount of lipid peroxide formed [10].

The process of pregnancy causes an increase in oxidative stress leading to the increase on the results of oxidation, such as MDA. Patil, et al (2006) found that MDA levels in pregnant women is higher than normal women (non-pregnant) [2]. Increased levels of MDA increased with gestational age, ie from the first trimester, second, and third. On the other hand, the levels of antioxidants both enzymatic and non-enzymatic decreased in pregnant women. SOD, GSHPx, and Catalase lower in pregnant women compared with non-pregnant women, and continued to decline seiringan gestational age [5].

In another study, Patil (2008) showed a significant decrease in antioxidant levels nonenzimatik number, such as Vitamin E, Vitamin C, and Vitamin-A in pregnant women. Decreased levels of antioxidants were greater in the third trimester of pregnancy [3].

Study on perimenopausal women formed many free radicals, which are known through MDA levels [17]. The product high MDA showed lower supplies of antioxidants the body so it can not prevent the formation of free radical reactions. The high levels of MDA which can be reduced with supplementation of isoy isoflavones and Zn [6].

The level of MDA also decreased after consuming linoleic vegetable oils, which contained α -tocopherol are antioxidants [18]. Decreased levels of plasma MDA was also reported by Young (1999), after 4 females and one male were consuming apple juice and raisins containing quecertin for a week [19].

There are still high levels of MDA in pregnant women in this study believed to be related to their exposure to cigarette smoke. Most pregnant women are exposed to smoke from their husband or another family members. Cigarette smoke contains 1014 free radicals in every suction. In addition, cigarette smoke contains ingredients hydroquinone / quinine, acrolein, formaldehyde asetadehid and free radicals that can trigger or weaken the antioxidants in the body [20].

Study conducted by Aoshiba (2003) proved that cigarette smoke can reduce levels Gluthatione of pulmonary (GSH) and decrease of Gluthatione peroxidase activity (GPx) [21]. However, the activity of free radicals at rats which exposed smoke chronically has decreased after the administration of extracts of black cumin [22].

5. Conclusion and Suggestion

1. The pregnant woman who consume moringa leaf extract had lower level of MDA
2. The provision of moringa leaf extract can inhibit the increase in MDA levels in pregnant woman.
3. Moringa leaf can be used as an alternative to improve the nutritional status and health of pregnant woman.

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