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# The Effect Of Giving The Supplement Of Kelor Leaves (Moringa Oleifera Leaves) Plus Royal Jelly To Malondialdehid Levels In Anemic Pregnant Women In Takalar District

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***Abstract: This study aims to determine the effect of supplementing Moringa leaf extract plus royal jelly on levels of MDA (Malondialdehyde) in anemic pregnant women. This research is a type of Experiment research and the design used is a randomized controlled. The subject in this study were pregnant women with anemia at 20-32 weeks of gestation which consisted of 3 groups, namely the Moringa leaf extract capsule group plus royal jelly (MLERJ), the Moringa leaf extract capsule group (MLE) and the placebo group. Total of 45 subject there are (MLERJ) n=15, (MLE) n=15 and placebo n=15. The treatment is given at a dose of 1x1 in the morning for 60 days and the urine sample taken will be tested in the laboratory using the ELISA Kit and data analysis using the paired sample T test and one way ANOVA test. Characteristics based on Age, Education, Occupation, Income and Parity of the subject.The results of the one way ANOVA test were not significant, but the difference in MDA levels in the MLERJ group was higher, namely -3.64 ± (6.21) than the -2.49 ± (4.06) MLE group and -0.37 ± (3.84) Placebo.***

***Keywords: Moringa leaves extract (MLE), royal jelly, MDA levels, anemic pregnant woman***

## 1. PREFACE

Pregnant women are one of the groups susceptible to oxidative stress due to an increase in metabolism, consumption of intake and an increase in basal oxygen demand, producing reactive oxygen species (ROS) which disrupt the balance between antioxidants and prooxidants. This increase in oxidative stress will directly result in the high formation of malondialdehyde (MDA), which is one of the products of lipid peroxidation as the cause of organ degeneration, disorders and damage to body tissues (Susantha, 2013).Anemia is a disorder caused by oxidative stress. In general, anemia is caused by iron deficiency because iron needs increase as the fetus grows while the intake consumed by pregnant women is insufficient. As a result, pregnant women will be more prone to suffer from anemia due to iron deficiency as gestational age increases (Roy & Pavord, 2018). Research conducted by Knutson, et al. In 2000 stated that iron deficiency anemia can increase oxidative stress (Nubekti Gian, 2013). This oxidative stress will then result in an increase in MDA levels in pregnant women in accordance with the increasing gestational age of the mother (Kontic Vucinic et al, 2008 in the journal Nadimin, 2016).

Pregnancies that are prone to oxidative stress will require additional antioxidants as a defense system to protect themselves from the threat of free radicals. Supplements that contain antioxidants and are rich in macro and micro nutrients for prevention of anemia are then needed, especially for pregnant women (Nadimin, 2016). In Indonesia, there are plants that contain many benefits for public health and contain very high nutrients ranging from macro nutrients to micro nutrients. The plant is Moringa oleifera or what is more commonly called the Moringa tree by Indonesians. One of the benefits that can be taken from the Moringa tree is contained in its leaves (Kouevi, 2013), besides that one of the drugs that is widely used for both traditional and modern medicine is Royal Jelly which contains water (50% -60%), protein (18%), carbohydrates (15%), and lipids (3% - 6%) (Pasupuleti et al., 2017).Through research conducted by Nurdin Syafruddin, et al (2018), it was found that moringa can function as a supplement to prevent various disorders in pregnancy, and anemia is one of the preventable disorders. Other studies have also shown that consumption of MLEt has the potential to reduce oxidative stress among pregnant women (Otoluwa, et al, 2014).

Royal Jelly acts on the cardio-vascular system and on the blood as a blood pressure regulator, energizer, as well as a recommended alternative medicine to treat anemia with 2-3 weeks of treatment which will significantly increase the number and quality of red blood cells (Pavel Crenguţa I., 2011).Other studies say that Royal Jelly converted into coenzyme A will help the body to metabolize lipids and then increase the capacity to respond to oxidative stress (Maghsoudlou Atefee, 2019). Composition of MLE and royal jelly has combinated can be used as an alternative to prevent and non-pharmacologically treat anemia and lower levels of MDA in pregnant women

## 2. MATERIALS AND METHOD

### *A. Research Location and Design*

This research was conducted in the working area of Puskesmas Polongbangkeng Utara District, Takalar Regency, South Sulawesi. The type of research used is True Experiment, and the design used is randomized double blind pretest-postest controlled double blind. The production of MLE and royal jelly under study was carried out by the herbal factory CV Neosyifa in Magetan, East Java which already has a BPOM license with the number POM TR203339021 with a formulation that is directly supervised by a pharmacist. MLE is given at a dose of 500 mg per day, while for the dose of MLERJ, 10 mg of royal jelly is added. The blood-boosting tablets (Fe) in this study were blood-boosting tablets obtained by mothers from ANC examinations at both the health center and the midwife's clinic and, as a control (placebo), a 00 capsule filled with starch (maezena flour) was made which was made under the supervision of Zakaria (Zakaria, et al, 2015). The packaging of these three groups used capsules of the same size, shape and color, and each group was only given a code so that neither the researcher nor the respondent knew which capsule group was given. Based on research considerations on the safety of using MLE, the dose given is once in the morning which is the minimum dose but still has the potential as a safe source of nutrients and antioxidants for pregnant women, namely between 250-500 mg. This extract will continue to be given for 2 months by the examination method using a control sheet.

### *B. Population and Sample*

The population of this study included all anemia pregnant women in the working area of the North Polongbangkeng District Health Center, Takalar Regency, with a sample of 45 people who were randomly selected. Each group consisted of 15 samples that met the inclusion criteria, namely pregnant women who had their pregnancy checked in the Puskesmas Polongbangkeng Utara District, had a gestational age of 20-32 weeks, suffered from mild to

moderate anemia with hemoglobin levels 8 g / dl to 10. 9 gr / dl, had parity of 1 - 4, was single fetus, was not taking other multivitamins during the study other than Fe, and was willing to participate in this study by signing an informed consent.

*C. Method of Collecting Data*

Researchers collected data by collaborating with midwives or field workers through the use of respondent demographic data sheets (bio, age, parity, education, occupation, income) and filtering questionnaires. Respondents were also asked questions about the consumption of Fe tablets, and Hb were measured, took a urine sample of 5 cc in the morning to then check the MDA level in the RSP UNHAS laboratory using the ELISA Kit.

*D. Data Analysis*

testing data on respondent characteristics (age, parity, education, occupation and income) uses Chi-square and Mann Whitney test. and the data were normally distributed then using the Paired sample T test. Data that were not normally distributed were tested using the Wilcoxon test, then analyzed univariately and processed using SPSS version 24. The Malondialdehyde Level (MDA) variable was analyzed bivariately using SPSS version 24 after previously carrying out the Shapiro Wilk data normality test. The data obtained is normally distributed, so it is continued with the paired sample T test to determine the effect of dependent and independent variables, and the one way ANOVA test to determine the differences in changes in dependent and independent variables (Dahlan S, 2016)

## 3. RESULTS

A. *Sample Characteristic*

Table 1: Sample Characteristic Distribution
Respondent's Characteristics Based on Age, Education, Occupation, Income and Parity

| Characteristic | Group | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | MLERJ | | MLE | | Placebo (Control) | | Total | | P value |
| | n | % | N | % | n | % | N | % | |
| Age | | | | | | | | | |
| High Risk | 11 | 32,4% | 11 | 32,4% | 12 | 35,3% | 100 | 100 | 1,000 [b] |
| Low Risk | 4 | 36,4% | 4 | 36,4% | 3 | 27,3% | 100 | 100 | |
| Education | | | | | | | | | |
| Low | 4 | 23,5% | 7 | 41,2% | 6 | 35,3% | 100 | 100 | 0,516 [a] |
| High | 11 | 39,3% | 8 | 28,6% | 9 | 32,1% | 100 | 100 | |
| Occupation | | | | | | | | | |
| Not Working | 10 | 28,6% | 13 | 37,1% | 12 | 34,3% | 100 | 100 | 0.193 [b] |
| Working | 5 | 50% | 2 | 20% | 3 | 30% | 100 | 100 | |
| Income | | | | | | | | | |
| <Rp.3.100.000 | 11 | 28,9% | 13 | 34,2% | 14 | 36,8% | 100 | 100 | 0,319 [b] |
| ≥Rp.3.100.000 | 4 | 57,1% | 2 | 28,6% | 1 | 14,3% | 100 | 100 | |
| Parity | | | | | | | | | |
| Primigravida | 9 | 37,5% | 7 | 29,2% | 8 | 33,3% | 100 | 100 | 0,765 [a] |
| Multigravida | 6 | 28,6% | 8 | 38,1% | 7 | 33,3% | 100 | 100 | |

Chi-square[a], Mann-Whitney test[b]

Table 1 shows that, based on age characteristics, most pregnant women with anemia for the low risk category (20-35 years) were in the placebo tablet group, namely 12 respondents (35.3%) while for the high risk category there were in the intervention group, namely 4 respondents (36.4%). On the characteristics of education, for higher education the majority was found in MLE, amounting to 7 respondents (41.2%). For the category of respondents who already have a job, the majority are in the MLERJ group, namely 5 respondents (50a%) while those who do not have a job the majority are in the MLE group totaling 13 respondents (37.1%).

The same thing also happened to the income category, namely income according to the UMR, the majority in the MLERJ group amounted to 4 respondents (37.1%) and the majority of income below the UMR was in the placebo group, namely 14 respondents (36.8%). Meanwhile, in the parity category, the majority of primigravidas were found in the MLERJ group, amounting to 9 respondents (37.5%), while in multigravidas the majority was in the MLE group, namely 8 respondents (38.1%).

Table 1 shows the results of statistical tests on all the characteristics that did not have a significant difference between age, parity, education, occupation, income and parity in the intervention group and the control group ($p > 0.05$). This means that all the characteristics of the research sample are not significantly different. In other words, the results of the study and the interventions given were not influenced by the characteristics of the study sample.

*Level of Malondialdehid (MDA)*

Table 2: Effects and differences in changes in MDA levels of anemia in pregnant women in the group of MLERJ, MLE capsules and Placebo

Effect before and after administration of MLERJ, MLE and Placebo on MDA levels in the intervention and control groups

| Independent Variable | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| | MDA Level (Nmol/Ml) | | P value | Difference | CI 95% | P-value |
| | Before Average (±SD) | After Average (±SD) | | | | |
| (MLERJ) | 40.89 ± (4.89) | 37.24 ± (4.21) | 0.039 [a] | -3.64 ± (6.21) | 7.08-0.20 | 0.182 [b] |
| MLE | 40.89 ± (5.75) | 38.40 ± (5.43) | 0.032 [a] | -2.49 ± (4.06) | 4.74-0.24 | |
| Placebo | 39.27 ± (6.15) | 38.89 ± (5.41) | 0.708 [a] | -0.37 ± (3.84) | 2.50-1.74 | |

Paired sample T test [a], One Way Anova [b]

Table 2 shows that the average MDA levels in anemic pregnant women before the intervention were higher in the three groups. However, after being given the intervention of MDA levels, there was a decrease in the average MDA level in the MLERJ group, MLE and

placebo group.
The table above is also the statistical test result of insignificant one way ANOVA analysis with the statistical result of the p value in the three groups is 0.182 (0.05). However, the gap in the difference in levels of Malondialdehyde in the MLERJ group was higher when compared to the MLE and placebo groups. This indicates that the supplement of MLERJ capsules can significantly reduce Malondialdehyde levels.

## 4. DISCUSSION

Moringa plants have leaves that contain the most complete nutrients and are rich in antioxidants when compared to any type of plant. This fact has triggered a lot of interest from various parties to process and develop the plant into a product, one of which is MLE in capsule form. Through research conducted by Nurdin Syafruddin, et al (2018), information was obtained that moringa can be used as a supplement to prevent various disorders in pregnancy, including anemia. Other studies have also shown that consumption of MLE has the potential to reduce oxidative stress among pregnant women (Otoluwa, et al, 2014). This is due to the content of 46 powerful antioxidants in Moringa as a compound that can protect the body from damage to cells by free radicals by neutralizing them before they can cause cell damage and become disease (Utami, et al., 2013).
Royal jelly is a product of honey bee cultivation which is closely related to bee feed, namely pollen and nectar, which are the raw materials for making royal jelly. Known as a functional food and rich in nutrients, royal jelly contains bioactive compounds as functional foods and provides many additional benefits related to general health promotion to the public in terms of prevention and treatment of certain diseases (Bogdanov, 2014). Royal jelly also has characteristics that make it a recommended alternative medicine to treat anemia with 2-3 weeks of treatment and can significantly increase the number and quality of red blood cells (Pavel Crenguţa I., 2011).
This study showed that, of the three groups of MLERJ, MLE and placebo, the most significant decrease in the average MDA level was in the group given MLERJ capsules. The results of this study are in line with other studies that have been previously described so it is hoped that the combination of MLERJ can be used as an alternative to prevent and non-pharmacologically treat anemia in pregnant women.
Fe tablet supplementation can be used as an option and has become a government program to meet the iron needs of pregnant women so that iron deficiency anemia does not occur which can cause metabolic disorders, oxygen demand and other disorders. However, Fe tablet supplementation in this study as a control used placebo did not show a significant effect in reducing MDA levels. This is because each Fe tablet contains only 60 mg of iron, 0.25 mg of folic acid and vitamin C in small amounts. On the other hand, the need for nutrients in the third trimester increases, especially folic acid which reaches 200mg per day. Folic acid itself is important because it is known to reduce MDA levels in pregnant women. If the intake of folic acid is not sufficient, there will be an increase in free radicals. Reactive Oxygen Species (ROS) will then become less stable and cause oxidative stress so that MDA levels increase (Misrawati, 2018).

## 5. CONCLUSION

Through the results in this study, it can be concluded that there is a decrease in the average MDA level after the intervention. The group of MLERJ capsule had a more significant effect when compared to the MLE group and the placebo group. Based on these results, consumption of MLE capsules plus royal jelly can be used as an effective non-

pharmacological alternative to reduce MDA levels in vulnerable groups, namely pregnant women who suffer from anemia.

*Ethical Agreement*

This research was conducted posterior to the agreement from the Ethical Commitee of Medical Faculty of Universitas Hasanuddin

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