

## **Supplementations on Pregnant Women and the Potential of Moringa Oleifera Supplement to Prevent Adverse Pregnancy Outcome**

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### **ABSTRACT**

Maternal mortality is still becoming major public health problems over the world. All countries, especially developing countries has taken a part to deal with this problem. The most common causes of maternal morbidity and mortality are anaemia during pregnancy. It is estimated that almost 30% of reproductive women are anaemic while pregnant women were 38.2%. Micronutrient supplementation is widely used to prevent anaemia during pregnancy and proved that the pregnancy outcome was better. However, a Moringa leaf, a local plant, is considered to contribute on anaemia prevention. This literature explained the benefit of micronutrient and Moringa-based supplementation in anaemia prevention and better pregnancy outcome. Based on literature, iron-folic acid is a global standard supplement program which used in many developing countries to prevent anaemia during pregnancy. Currently, studies on Moringa extract give evidence to government and community to utilize this local food in order to prevent anaemia and adverse pregnancy outcome.

**Keywords:** Pregnant women, maternal health, Moringa Oleifera, pregnancy outcome

### **INTRODUCTION**

The issue regarding maternal and child mortality is ever-increasing in last decades. It has been confirmed that nutrition plays pivotal role in maternal and child health besides other factors, such as health environment, socioeconomic, previous pregnancy condition, and even stress and fatigue of pregnant mothers (Villar et al., 2003; Purandare, 2012; Cheng and Pickler, 2014). The most pregnancy-related problem

over the world is anaemic. It is estimated that almost 30% of reproductive women are anaemic while pregnant women were 38.2% (WHO, 2011). Furthermore, similar result has found been in Indonesia in which the prevalence of anaemic pregnant women were 37.1% (Litbangkes, 2014).

Poor nutritional intake is considered as the major factors underlying iron deficiency anaemia besides infection disease and menstrual blood loss (Van Den Broek, 2003; Tadesse et al., 2017). This problem leads to adverse outcome of pregnancy, such as intra utero growth retardation, preterm birth, low birth weight, and prenatal death (Haider et al., 2013). Therefore, to overcome these problems, in both developed and developing countries, supplementation programs has been established yet (Beard, 2000). Currently, iron-folic acid supplement is a wide-used supplement for anaemia prevention (WHO, 2016a, 2016b). However, the evidence for multi-micronutrient, vitamin A, and zinc supplement in anaemia prevention were also clear.

In addition, Moringa-based supplement may have impact on pregnant women and prevent adverse pregnancy outcome. Our previous studies showed that Moringa extract could reduce maternal DNA damage (Otoluwa et al., 2014). Similar result was showed by a study which Moringa Oleifera has significantly increased haemoglobin concentration among anaemic women (Sindhu et al., 2013). Obviously, Moringa Oleifera may have potential effect on women including those who are

pregnant.

In this literature, the author will explain the experience of intervention of supplement in order to improve maternal health during pregnancy and even postpartum period. This literature review will also reveal the potential effect of Moringa Oleifera as the alternative supplement for pregnant women.

## **DISCUSSION**

### **The Supplements Intervention during Pregnancy**

WHO has issued several guidelines of nutrition intervention for pregnant women, such as iron-folic acid, vitamin A, vitamin D, iodine, and calcium supplementation. These sorts of interventions, basically, have different purpose in pregnancy mechanisms(WHO, 2013). Pregnant women should meet the requirement for certain nutrients especially micronutrients to ensure the better pregnancy outcome later on. One of the major problem of pregnancy outcome is low birth weight which has emerged due to maternal poor nutrition (Sharma and Mishra, 2013).

Maternal mortality is still the major public health problems worldwide which mainly caused by anaemia. To overcome this problem, WHO issued recommendation for iron (60 mg) and folic acid (2.8 mg) supplementation adult women and adolescent girls(WHO, 2013). Even after delivery, women should take about 6-12 weeks of iron-folic acid supplementation for reducing anaemia (WHO, 2016b). A study concluded that iron supplementation could increase haemoglobin concentration but the evidence is limited to show the effect of the supplementation in reducing anaemia prevalence (Sloan et al., 2002). Fundamentally, haemoglobin is influenced by several factors, such as the type of iron-sourced diet, composition of the diet, infectious diseases, and menstrual period (Glover-Amengor et al., 2005; Bothwell, 2000). By giving appropriate dose, alone or combined with other micronutrients, it may

improve haemoglobin level (Sloan et al., 2002). Conversely, different result showed by a study where iron supplement compared to placebo is not significant different (Cogswell et al., 2003).

Beside iron folic acid, many micronutrients have positive contribution to reproductive women. Vitamin D supplementation, for instance, has been reported by scientific paper having an effect on complications during pregnancy and adverse infant outcomes(WHO, 2012).Maternal vitamin D deficiency is associated with gestational diabetes, pre-eclampsia, and her developing foetus. Vitamin D plays important role in foetal skeletal development and tooth formation(Wagner et al., 2012). A few studies to investigate the effect of vitamin D supplementation (400 to 1000 IU/day) during pregnancy showed inconsistency. However, A Cochrane review, the robust systematic review studies on pregnant women, shows that not enough evidence to prove the health benefit of vitamin D (De-Regil et al., 2012). On the other hand, 4000 IU of D<sub>3</sub>/day may increase circulating 25(OH)D concentration in which the higher concentration have been linked with the better health outcome in pregnant women(Wagner et al., 2012).

### **Effect of Moringa Oleifera on Pregnancy and Pregnancy Outcome**

The development of functional food is inevitable. The most popular of local plant which has tremendous benefit to health is Moringa Oleifera. Based on the study by Fuglie, Moringa leaf has various micronutrients that include iron (7 mg) in 100 g leaves (Fuglie, 2005).In addition, Moringa leaves contain rich of vitamin A, vitamin B, vitamin C, and calcium. Therefore, Moringa leaves are suitable not only for pregnant women but also for all age group (Srikanth et al., 2014).

Moringa Oleifera tree has many medicinal properties, therefore, this plant is so-called the miracle tree or in Senegal it is well-known as never-die plant (Fuglie, 2005). Moringa Oleifera could be an

effective anticancer agent and play important role for anti-diabetic properties (Gopalakrishnan et al., 2016). Moringa Oleifera is also reported to be good antimicrobial agents and has high

antioxidant activity (Faizal et al., 2014). Some studies have proved that Moringa-based supplementation has several advantages for health, especially for pregnant women (Table 1).

**Table 1. Various effect of Moringa-based supplement in women**

No.	Study	Method	Result and Conclusion
1.	(Sindhu et al., 2013)	Samples were 60 women from low socioeconomics aged 15 to 45 years. Intervention group was given 100mg/day while control group was given normal diet.	The study result showed that 23 women in intervention group had haemoglobin level improved while control group was only 3 women. The study concluded that haemoglobin level in reproductive age group could be improved by intervention of Moringa leaf.
2.	(Muis et al., 2014)	The study design was double blind randomized controlled intervention. Study participant were 68 which divided into two groups, intervention (n=35) and control group (n=33).	The result of this study showed that Moringa extract could increase MUAC and reduce occupational stress significantly but not haemoglobin. MUAC measurement in intervention group increased 0.98 cm during intervention while control group was only 0.45.
3.	(Otoluwa et al., 2014)	This study was double blind randomized controlled trial. A total 76 of pregnant women were enrolled. The intervention given to respondents was Moringa leaf extract+60 mg iron+400 microgram folic acid and control group was given the same without Moringa extract.	About 36% 8-OHdG of intervention group was reduced during intervention while control was only 30%. Although there was no significantly different between intervention and control group, long-term use of Moringa leaf extract along with iron folic acid potentially reduce stress oxidative among pregnant women.
4.	(Nadimin et al., 2015)	The study design was double blind randomized, pretest-posttest controlled group. The study participants were pregnant women in 2 <sup>nd</sup> trimester. The participants were divided into two groups, intervention (Moringa leaf extract) and control group (60 mg +0.25 mg folic acid). The number of person each group were 35 and supplemented for 12 weeks.	Haemoglobin status in both, intervention and control group, increased significantly (0.47±1.31 vs 0.99±1.76). Although control group had higher increase compared to intervention, there was no significant differences of haemoglobin changes (p=0.168). Both Moringa and iron-folic acid supplements could be used for anaemia prevention among pregnant women.
5.	(Suzana et al., 2017)	This study was randomized placebo controlled trial. 16-49 years anaemic women who received Moringa leaf extract (1400 mg+200 mg ferrous sulfate/day) were considered as intervention groups while it was only 300 mg ferrous sulfate for placebo group.	After intervention, haemoglobin increased significantly (0.794±0.81 g/dL). This study concluded that Moringa extract has health benefit to increase haemoglobin concentration in pregnant women.

Since many benefits of Moringa leaves have been found, then its health potential can also be used to overcome nutritional and health problems in pregnant women and pregnancy outcome. However, in a study showed that there were no effect of Moringa extract on maternal anaemia and birth weight (Iskandar et al., 2015). That result is rational and probably shows inconsistency with the other studies. Many factors determine that Moringa extract cannot increase haemoglobin including bioavailability and typical diets (Idohou-Dossou et al., 2011). Moringa extract dose probably influences the result on haemoglobin. 1400 mg of Moringa extract per day increased significantly haemoglobin and the result higher than control group (Suzana et al., 2017).

For birth weight, supplementation by using Moring extract has positive effect on low birth weight prevention. Although there was no statistically difference, baby's

weight was higher in Moringa intervention group than control group (3.07 kg vs 3.03 kg, respectively) (Iskandar et al., 2015). Another finding by researcher regarding Moringa Oleifera was the components of phytosterol that potentially increase the production of estrogen in which benefit for improving breast milk production. Therefore, therapy with Moringa supplement could increase the successfulness of exclusive breast milk by (Gopalakrishnan et al., 2016).

## CONCLUSION

To sum up, iron folic acid supplement along with another supplement are still used worldwide because their health effect during pregnancy has been proved. Local foods, such as Moringa Oleifera, have health benefits by which not only to support pregnant women during pregnancy but also to prevent adverse pregnancy outcome. Therefore, this literature review

recommends the use of Moringa-based supplement with appropriate dose during pregnancy prevent unexpected pregnancy outcome.

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