

Review: The Effectiveness of Using Vitamins in Pregnant Women as Prevention of Pre-eclampsia

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Abstract



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Nutrients needed by pregnant women are high. The variety of vitamins consumed early in pregnancy can affect the condition and growth and development of the baby and the health of pregnant women. The incidence of pre-eclampsia is one of the things that most often appears in pregnant women who are at risk for mothers and newborns. This study will look at vitamins that play an important role in preventing the occurrence of pre-eclampsia. The study used the PICO method in search and assessment of 13 articles obtained from the PubMed and Research Gate databases. Some of the vitamins needed by pregnant women include calcium, folic acid, iron, mecobalamin, zinc, vitamins A, E, and pyridoxine. All vitamins have a positive effect on pregnant women in supporting growth and also maintaining the health of pregnant women. Folic acid and calcium play an important role in maintaining blood pressure. This is related to the presence of homocysteine and endothelial dysfunction that occurs in the first and second trimesters. Zinc itself has a role in maintaining mental health which usually occurs due to premenstrual syndrome and also pregnancy in the early trimester. This is because of blood pressure disorders due to mental health. However, there is nothing that shows a relationship with the incidence of pre-eclampsia. The most important vitamins for maintaining blood pressure during pregnancy are folic acid and calcium.

Keywords: Vitamins, Pregnant, Pre-eclampsia, Preterm Birth, Effectiveness.

INTRODUCTION

Pregnancy also known as gestation is the period in which one or more offspring develop inside a woman. Preeclampsia is a complication condition where there is an increase in blood pressure which usually occurs at 20 weeks of gestation and above. This can be fatal for both the mother and the baby if left unchecked before birth. Some things that can affect food intake during pregnancy.

Iron supplementation alone or in combination with folic acid has been associated with maternal and fetal health. This leads to a significant reduction in the incidence of anemia during pregnancy and, as such, plays an important role in reducing maternal morbidity and mortality¹.

Vitamin A plays an important role in eye function, as it is involved in cell differentiation, maintenance of eye integrity, and prevention of xerophthalmia. Its deficiency is the leading cause of preventable blindness worldwide².

Folate is an essential nutrient that plays an important role in cell division, DNA repair, and tissue growth³. Folate and folic acid are water-soluble forms of vitamin B9. Folate is present in legumes, green leafy vegetables, and some citrus fruits; low folate intake is common where the staple diet consists of cereals, and low intakes of folate-rich legumes, vegetables, and fruit^{4,5}. Folic acid is synthetic acid and the most stable form of folate and is often used in supplements and fortified foods. The bioavailability of folic acid is about 70% higher than folate

naturally contained in food, although there is wide variation depending on the assessment method⁶.

In this fast-paced modern era, food is one of the commodities that is certainly influenced to always be served in a short time without taking into account whether the vitamin content in it is still intact and safe for pregnant women or not. In this study, we will conduct a review regarding the use of vitamins which can certainly have an effect on maintaining the health of the mother and the baby during pregnancy.

This review was conducted with the aim of knowing the effect of each administration of vitamins on women and what vitamins are very important during pregnancy in women. This is of course very important to know, where the knowledge and awareness of young mothers is mainly very low so that the risk can be experienced by pregnant women or the baby to be born.

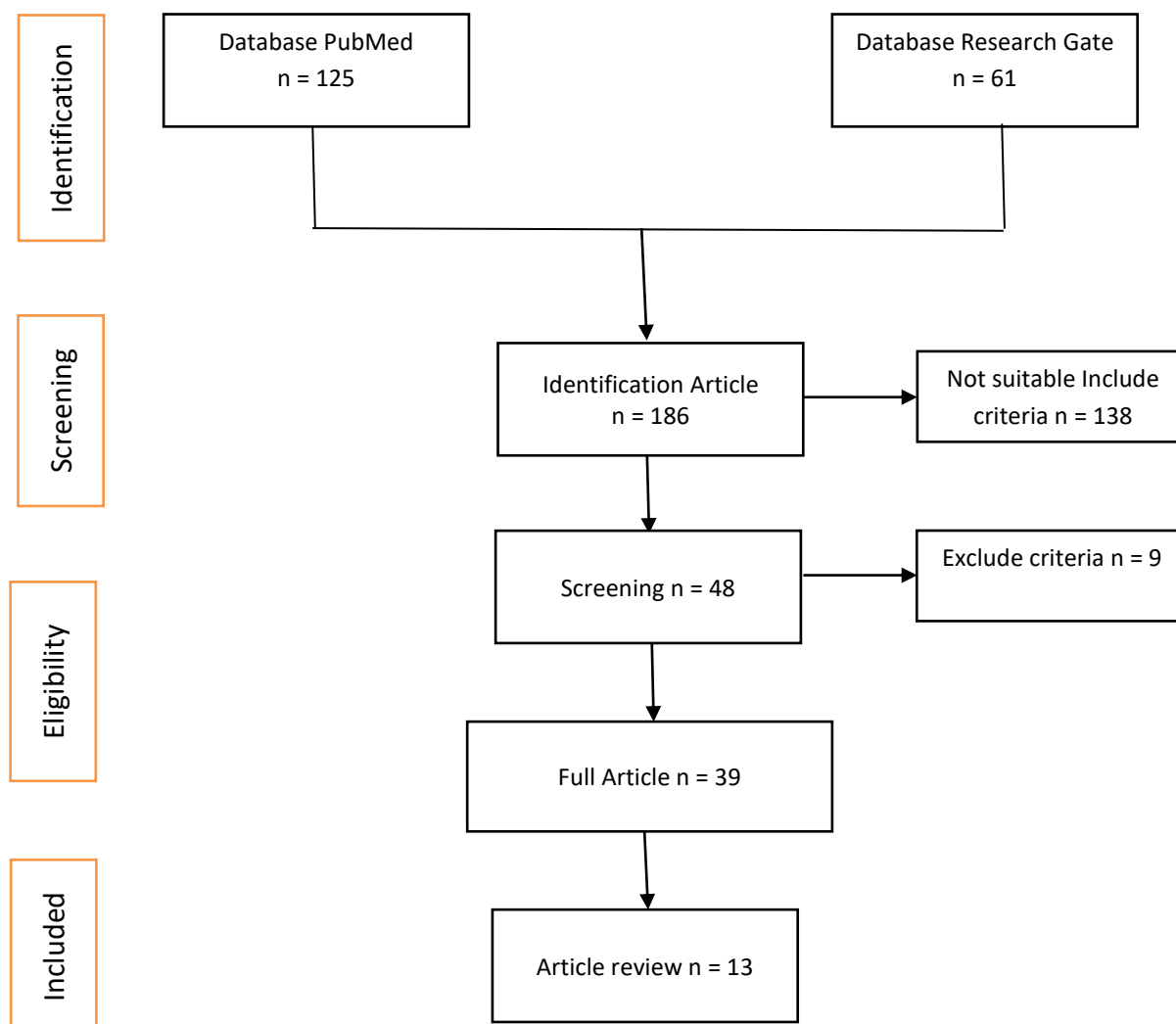
RESEARCH METHODS

This study is an *observational* with a design *analysis review* that uses the PICO (*Patient, Intervention, Comparison, and Outcome*) search method. In this design study, researchers will search for articles with the keywords "Pre-Eclampsia and Vitamins" in several journal databases. The time specified is the research of the last 5 years. This study conducted a search on databases such as Pubmed, Google Scholar, and Garuda Portal.

The inclusion criteria in this study are observational research articles, articles that include research data with statistics,

research with a publication time span of 2016 to 2021, and articles with experimental and observational research.

Quality Assessment



RESULTS AND DISCUSSION

Giving vitamins during pregnancy is not only for the mother-to-be but also for the baby-to-be. Adequate intake of food and vitamins that are not appropriate can cause several problems so it is necessary to take into account several vitamins that are considered to be able to maintain maternal health, especially

for blood pressure and reduce the risk of pre-eclampsia, namely folic acid, vitamin E, vitamin B12, vitamin D, zinc, and Calcium. This vitamin has several mechanisms of its own in reducing the risk of increasing blood pressure during pregnancy. From the search results, several vitamins were found which showed the following results:

No	Author	Vitamin	Dose	Effects
1	Mahmoud, 2009 ⁷	Folic acid	-	Lowers the risk of pre-eclampsia
		Mecobalamin	-	Not significant
2	Greiner, 2011 ⁸	Vitamin E	400 IU/d	Reduces the risk of premenstrual syndrome
		Vitamin D	-	Reduces risk of osteoporosis
		Iron	High dose avoid	Reduced low birth weight (LBW)
		Zinc	25 mg/d	Mental health
		Vitamin A	10000 IU	Increased Breast milk
		Calcium	1200 mg/d	Reduces risk of pre-eclampsia and premature birth
3	Wang, 2015 ⁹	Folic Acid	>100 g	Reduced homocysteine and endothelial dysfunction
4	Wen et al, 2013 ¹⁰	Folic acid	>2 mg	Dosage >2 mg can reduce the incidence of pre-eclampsia to OR 0.08

The use of folic acid can reduce the risk of pre-eclampsia. Folic acid is a very cheap intake, so the use of folic acid is the right choice for people with middle to lower economic conditions. The relationship between the uses of folic acid during pregnancy can also affect the birth weight of the baby. Consumption of folic acid during pregnancy has shown a decrease in trophoblast invasion abnormalities in the uterus in pre-eclamptic patients, so it does not affect newborn weight. This will certainly reduce the incidence of postnatal NICU care due to pre-eclampsia. Folic acid is also thought to lower homocysteine levels, which play a role in the risk of pre-eclampsia. The first stage begins with abnormal placental perfusion in the early to second trimester. This is followed by systemic endothelial dysfunction which is common in the second trimester. This causes the incidence of pre-eclampsia in the last trimester. Folic acid can reverse the disruption of endothelial function that occurs to reduce the release of homocysteine. This shows that folic acid is very important in the first and second trimesters of maternal pregnancy. The odds ratio value of pre-eclampsia in the use of folic acid only reached 0.6, which means the risk can be said to be almost non-existent^{11, 12, 13, 14}.

Folic acid has a direct mechanism to increase placental implantation and endothelial function while reducing homocysteine which can reduce maternal endothelial disorders so that the incidence of preeclampsia is getting smaller. Research using the RCT method showed that the odds ratio in patients taking folic acid at a dose of >2 mg was only 0.08 with an incidence percentage of 2.94%, whereas in patients taking <1 mg the odds ratio was 0.74 with an incidence percentage of 9.09%.

Use of calcium in pregnant women can reduce the risk of pre-eclampsia, blood pressure of pregnant women, and preterm birth. The incidence of anemia in pregnant women can also result in low-birth-weight babies. However, high levels of iron in the blood have been associated with the risk of fetal growth restriction, preterm delivery, and preeclampsia. The incidence of pre-eclampsia that occurs at high iron levels is associated with the risk of developing gestational diabetes¹⁶.

Vitamin A does not affect blood pressure, but its use can stimulate the formation of breast milk at birth. Some mothers have difficulty when they first want to breastfeed. The consumption of vitamin A throughout pregnancy can help the mother's program to provide sufficient breast milk for up to 2 years¹⁷.

Zinc in general can be used to boost the immune system. In pregnant women, the use of zinc can affect mental health. Mood disorders that usually appear in premenstrual syndrome (PMS) can also appear in pregnant women, especially in the first trimester where the condition of the hormones progesterone and estrogen is not stable. This can indirectly affect blood pressure.

CONCLUSION

Vitamins that are directly related to the incidence of pre-eclampsia and are thought to have an effect on reducing the incidence of pre-eclampsia in pregnant women are vitamins, folic acid and calcium. So it is important for pregnant women to consume it early in pregnancy to reduce the risk of its occurrence.

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