



ORIGINAL RESEARCH PAPER

Health Science

THE DIFFERENCES OF ZINC AND ALBUMIN LEVELS BETWEEN SPONTANEOUS ABORTION AND NORMAL PREGNANCY

KEY WORDS: Zink, Albumin, Spontaneous Abortion, Pregnancy Normal

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ABSTRACT

Background: Zinc is one of the elements essential mineral that is essential for cell growth, development and cell differentiation. This mineral circulates in the blood is bound by albumin around 70%, Zink and albumin have a role in the activity of the enzyme superoxide dismutase (SOD) as the body's defense system mainly from the activity of compounds of Reactive Oxygen Species (ROS), which can make oxidative stress and cause spontaneous abortion. This study aims to determine the levels of zinc and albumin difference between spontaneous abortion and normal pregnancy.

Method This study was an observational with cross sectional design study was conducted from July 24 until 24 September 2017 in dr. Rasidin Padang, RS TK III dr. Reksodiwiry Health Center Andalas Padang and Padang. Serum examination in Biomedical Laboratory Padang Andalas University School of Medicine and Health Laboratory UPTD West Sumatra Province. Samples were taken from pregnant women diagnosed with spontaneous abortion and normal pregnant women with gestational age <20 weeks by 40 samples. Sampling consecutive sampling. The level of zinc and albumin through the blood serum examined by colorimetric method. Test data normality using Shapiro Wilk test followed by an unpaired t test.

result: The mean levels of zinc in spontaneous abortion group (105.99 ± 7.15) was lower than the normal pregnancy group (111.00 ± 9.06) with $p = 0.06$ and the mean levels of albumin in spontaneous abortion group ($4, 29 \pm 0.47$) was lower than the normal pregnancy group (4.40 ± 0.33), with $p = 0.407$.

Conclusion: There is no significant difference between the levels of zinc and albumin spontaneous abortion and normal pregnancy.

PRELIMINARY

Abortion is the interruption of a pregnancy in which the state has not been able to live on her own fetus outside the uterus, fetal weight <500 grams or gestational age less than 20 weeks 1. Abortion can be life-threatening mother can even donate the increase in maternal mortality due to several complications of abortion include hemorrhage, perforation, infection and tetanus, acute kidney, as well as shock 2.

Abortion can be caused by one of them is a nutritional disorder 2. Research in Nigeria stated that zinc deficiency during pregnancy can affect the development of the embryo and fetus through various mechanisms such as reducing cell proliferation, protein synthesis and increase the oxidative deterioration of cells and this is contributing to the occurrence of spontaneous abortion 3.

Maternal nutritional status during pregnancy is an important determinant of fetal growth and development 4 .. Approximately 82% of all pregnant women in the world suffer from zinc deficiency can become a chronic infection and reduce the plasma zinc concentration. The concentration of lower maternal zinc can cause a reduction in the transport of zinc into the placenta and fetus which can lead to poor fetal growth becomes 5. Deficiencies of zinc inhibit the development of the placenta, including trophoblast differentiation, the size of the placenta, birth weight and protein expression 6. zinc deficiency does not occur if absorption of zinc in the body is good. Zinc absorption is affected by the albumin. Levels of albumin contribute to a reduction in total concentration of zinc during kehamilan 7.

Zink and albumin have a role in the activity of the enzyme superoxide dismutase (SOD) as the body's defense system, especially the activity of compounds of Reactive Oxygen Species (ROS), which can make oxidative stress and cause spontaneous abortion 8. The balance between ROS production with physiological antioxidant activity will affect the balance of homeostasis mobile, but if the balance is disrupted due to the increase in ROS production then occurs later oxidative stress leads to cell damage and cell dysfunction, Cell damage caused by oxidative stress can be identified resulting in spontaneous abortion, recurrent abortion, hydatidiform mole and 9.10

embryogenesis damage. Recent research indicates oxidative stress due to an imbalance of oxidants and antioxidants in Uteroplacental network which plays an important role in the cause of abortion 11.

MATERIALS AND METHODS

Observational research on two groups of unpaired (independent) with cross-sectional design. The research was conducted from July 24 until 24 September 2017 in Dr. Rasidin Padang RS Tk III dr. Reksodiwiry Health Center Andalas Padang and Padang. Serum examination in Biomedical Laboratory Padang Andalas University School of Medicine and Health Laboratory UPTD West Sumatra Province. The study was conducted in 40 respondents (20 spontaneous abortion group and 20 normal pregnancy group) met inclusion criteria that pregnant women who have been diagnosed by a physician experienced a spontaneous abortion Sp.OG with a gestational age of 20 weeks based medical record, normal pregnant women with gestational age <20 weeks by LMP attaching KIA book and ultrasound to attach the results of ultrasound, maternal age 20-35 years based on Resident Identity Card (KTP)., mother with parity ≤ 3 based on medical records and are willing to be involved in the research. The level of zinc and albumin through the blood serum examined by colorimetric method that measures the color of a substance as a comparison. Data processing is done by using editing, coding, entry and tabulating. Data was analyzed using normality test Shapiro-Wilk then analyzes the differences between the two variables using independent t test.

RESULTS

Table 1. Characteristics of Research Subjects

characteristics	Group		P
	Spontaneous abortion (n = 20)	Normal pregnancy (n = 20)	
	Mean \pm SD Median \pm IQR	Mean \pm SD Median \pm IQR	
Age	26.20 \pm 4.11	27.20 \pm 3.45	.410
parity	2.00 (1-3)	1.00 (1-3)	0.131

The results of the research that age and parity did not show any significant difference between the two groups with $p = 0.05$.

Table 2. The mean levels of Zink On Abortion and Pregnancy Normal Group

variabel	Group		The mean difference	P
	Spontaneous abortion	Normal pregnancy		
	n = (20) Mean ± SD	n = (20) Mean ± SD		
content Zink (Ug / dl)	105.99 ± 7.15	111.00 ± 9.06	5.012	0.06

Research result shows that there is no significant difference between the levels of zinc in spontaneous abortion group with normal pregnancy group with $p = 0.060$ ($p > 0.05$).

Table 3. Average levels of Albumin On Abortion and Pregnancy Normal Group

variables	Group		The mean difference	P
	Spontaneous abortion	Normal pregnancy		
	n = (20) Mean ± SD	n = (20) Mean ± SD		
Albumin levels (G / dl)	4.29 ± 0.47	4.40 ± 0.33	.110	0,407

The above table shows that there is no significant difference between the levels of albumin in spontaneous abortion group with normal pregnancy group with $p = 0.407$ ($p > 0.05$).

DISCUSSION

Subjects of this study consisted of 40 respondents (20 spontaneous abortion group and 20 normal pregnancy group) in at Dr. Rasidin Padang RS Tk III dr. Reksodiwiryo Padang, Health Center Andalas Padang on 24 July until 24 September 2017.

The mean age at spontaneous abortion group (26.20 ± 4.11) was lower than the normal pregnancy group (27.20 ± 3.45) and median parity in spontaneous abortion group at 2.00 (1-3) was higher than the median parity normal pregnancy group of 1.00 (1-3).

Research result showed that age and parity did not show any significant difference between the two groups with $p \Rightarrow 0.05$ (age = 0.410, parity = 0.131).

The mean levels of zinc in spontaneous abortion group (105.99 ± 7.15) was lower than the normal pregnancy group (111.00 ± 9.06). Statistical analysis showed that there was no significant difference between the levels of zinc in spontaneous abortion group with normal pregnancy group with $p = 0.060$ ($p > 0.05$).

Zinc physiological needs depending on age and physiological status of a person. Trends in the value of zinc in serum low in childhood and increased peak in adolescence and adulthood, whereas the physiological status of a person if someone in pathological conditions would spend reserves of zinc available in the body and in this condition needs zinc will increase and if someone in physiological state (health) needs to replace the zinc is absorbed only spending endogenous tissue formation, growth and secretion 11.

In the event of the availability of zinc deficiency *superoxide dismutase* (SOD) becomes low and an increase in Reactive Oxygen Species (ROS), which contribute to blood vessel damage and failure spiral arteries remodeling. Blood supply becomes inadequate to the placenta and the case of oxidative stress as a whole would lead to degeneration of the placenta by loss of function of the syncytiotrophoblast and the attachment of the placenta to the uterine wall and will have a negative effect on a pregnancy that pregnancy can not be maintained and occurred expenditures products of conception spontaneously (abortion spontaneous) 12.13.

Statistical results of this study are consistent with studies Wilson et al (2016) 14 which showed no significant relationship between

zinc status with the success of pregnancy ($p > 0.05$). Research Ota et al (2015) 15 also shows the same result that there is no clear distinction between the maternal deficiency of zinc and the control group with the results of the pregnancy, the research is also consistent with research Chaffe and King (2012) 16 that there is a low relation between supplementation zinc with fetal outcome ($p > 0.05$).

The mean levels of albumin in spontaneous abortion group (4.29 ± 0.47) was lower than the normal pregnancy group (4.40 ± 0.33). Statistical analysis showed that there was no significant difference in levels of albumin in spontaneous abortion group with normal pregnancy group with $p = 0.407$ ($p > 0.05$).

Formation of albumin decreased relatively early on protein malnutrition and illness conditions 19 4. Jika albumin failed to perform its functions will be increased ischemia modified albumin (IMA) will trigger oxidative stress and lipid peroxide so as to affect the circumstances of a pregnancy 20,21.

Protein Energy Deficiency (PEM) cause low levels of zinc in a museum this is because the main transport means of zinc in serum is albumin 22, 11. This is consistent with the findings that the levels of albumin in the abortion group was lower than normal pregnancy group followed by zinc levels. Albumin and zinc has a positive relationship it is consistent with research Kumera et al (2015) 23 which states that serum zinc levels decreased serum albumin followed during pregnancy.

The results are consistent with research Prefumo et al (2007) 17 that IMA

in early pregnancy are used for the diagnosis of myocardial ischemia in women is not used as a marker of ischemia in pregnancy to support the development of normal trophoblast associated with hypoxic intrauterine environment with $p > 0.05$. Research Veronika et al (2015) 18 also showed that there was no significant correlation between serum albumin with maternal morbidity and mortality ($p = < 0.05$).

The results of this study are not consistent with research Kumera et al (2015) 23, which explains that there is a significant correlation levels of albumin in the abortion group with the control group, with $p = 0.002$. Albumin levels contribute to the decline in total concentration of zinc during pregnancy and facilitate the absorption of zinc by the placenta and the mother 7. Similarly, the research Bahinipati and Prakash (2016) 21 claimed that the high ischemic modified albumin will bring oxidative stress and lipid peroxides that can affect the state of a gestation,

Differences resulting research results of other studies involving socio demographics, reproductive history (parity, spacing of pregnancy, trimester) and nutritional factors associated with using a structured questionnaire. Kuesinoer about the diversity of the food is made according to the standard of the guidelines Perseriakatan Food and Agriculture Organization of the United Nations (FAO) and through validity test while the study did not involve the factor 23.

CONCLUSION

1. There were no significant differences in zinc levels between spontaneous abortion and normal pregnancy
2. There were no significant differences in levels of albumin between spontaneous abortion and normal pregnancy

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