CORRELATION OF VITAMIN D WITH FERRITIN IN PREGNANT MOTHERS CHRONIC ENERGY DEFICIENCY OF THE SECOND TRIMESTER

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Abstract: Based on the prevalence of the Kediri Health Office in 2013 and 2014, pregnancy in CED in Kediri was 6.6% and 6.7%, which was an increase of 0.1% from the previous year. *According to the prevalence of CED pregnancy in Badas Puskesmas in 2013 and 2014, it was 7.8% and 6.1%. Aimed at knowing the differences in vitamin D levels in normal pregnancy with second trimester CED pregnancy; know the difference between ferritin in normal pregnancy and second trimester CED pregnancy; know the correlation between vitamin D and ferritin in normal pregnancy and second trimester CED pregnancy; know the correlation between vitamin D and UAC in normal pregnancy and second trimester CED pregnancy. This study used an analytical test (case-control) with randomization of pregnant and pregnant CED patients in the Sukomanunggal district. The results showed that the difference in Vitamin D (33.5380 ± 5.60498 vs 32.4300 ± 4.40708) p = 0.166, the comparison was not significant. The difference in ferritin (17.4080 ± 10.90625 vs 24.7420 ± 21.79586) p = 0.388 comparison was not significant. The correlation between vitamin D and ferritin (p = 0.030) had a significant relationship. There was no significant correlation between Vitamin D and UAC (p = 0.730). The correlation between ferritin and UAC (p = 0.304) was not significant.*

Keywords: *Vitamin D, Iron, Ferritin, UAC, CED*

INTRODUCTION

According to the World Health Organization (WHO), maternal mortality due to bleeding is 28% and infection is due to anemia and chronic energy deficiency (CED) in the mother.[1] Based on the prevalence of the Kediri Health Office in 2013 and 2014, pregnant women with CED in Kediri were 6.6% and 6.7%, which was an increase of 0.1% from the previous year. According to the prevalence of SEZ pregnant women in Badas Health Center in 2013 and 2014 it was 7.8% and 6.1% (Kediri District Health Office, 2013 and 2014).[2,3]

Pregnant women with SEZ show that their energy and nutrient intake needs are not fulfilled before or during pregnancy. Lack of nutrition can interfere with the development of the baby, besides that it is very important to pay attention to the possibility of gestational diabetes conditions and nutritional deficiencies during pregnancy can be indicated by the different prenatal body mass index (BMI) in each mother.[4–6]

Chronic malnutrition makes it possible to give birth to babies with low birth weights and the risk of severely stunted growth, which also causes stunted growth during adulthood.[2] Iron deficiency and vitamin D deficiency are very important nutritional health problems. When there is a nutritional deficiency, iron deficiency and vitamin D deficiency will occur simultaneously.[7,8] From the existing background, a study was conducted on the differences in vitamin D levels of pregnant women with CED compared to normal pregnant women.

RESEARCH METHODS

The type of research used is analytic test research which is case control. This study uses randomization of patients with pregnant women and pregnant women with chronic energy deficiency (CED) in Sukomanunggal sub-district. This study aims to analyze the difference between vitamin D and serum iron levels in normal pregnant women and pregnant women with CED.

The study population was pregnant women in the Sukomanunggal sub-district in the second trimester. From the results of the sample calculation using the lameshow formula, it was found that the number of samples was 19.4, rounded off by 20 pregnant women (10 normal pregnant women and 10 pregnant women) (p1 = 0.995 and p2 = 0.812, Jing Lee et al, 2014).

The inclusion criteria of this study were pregnant women with normal pregnancy criteria without complications of pregnancy and pregnancy with CED. Pregnant patients with CED based on the calculation of upper arm circumference. Exclusion criteria were pregnant patients outside the 2nd trimester and had intervention in pregnancy with CED in the form of adding multivitamins, minerals and other supplements.

The independent variables in this study were pregnant patients with low energy, the dependent variables were vitamin D levels and total iron. The time and place of the research were in February – May 2020, at Sukamanunggal District.

RESULTS AND DISCUSSION

The patients characteristic in this study is described in table 1.

Table 1. Description of Patient Characteristics Based on Mean

No	Description	Mean ± Std. Deviation Cases (CED)	p	Mean ± Std. Deviation Normal	p
1.	Maternal Age	26.60 ± 5.700	0.295	26.10 ± 5.466	0.890
2.	Gestational Age	23.40 ± 1.075	0.177	23.70 ± 1.160	0.124
3.	Weight	51.60 ± 6.041	0.210	62.40 ± 7.336	0.015
4.	Height	152.40 ± 4.115	0.205	152.10 ± 3.843	0.243
5.	BMI	22.2390 ± 2.74345	0.654	26.9497 ± 2.71765	0.033
6.	UAC	20.30 ± .949	0.002	27.00 ± 1.764	0.167
7.	Systolic	106.00 ± 6.992	<0.0001	114.00 ± 5.164	<0.0001
8.	Diastolic	71.60 ± 7.531	0.073	77.00 ± 4.830	<0.0001
9.	HB	11.1100 ± 1.16662	0.858	10.5300 ± 2.24304	0.070
10.	Albumin	4.2600 ± .45753	0.079	4.5500 ± .47900	0.335
11.	ERY	4.4020 ± .90460	0.596	3.9980 ± .90626	0.184

Descriptive data from the characteristics in this study showed quite varied results. There are 11 characteristics that we analyze, to find out how the homogeneity and distribution are. In this study, there were two research groups, namely cases and controls. In the control group, for the characteristics of maternal age, gestational age, height, UAC, hemoglobin (Hb), albumin and erythrocytes, the results showed that there were no differences between the study samples in the control group, this means that these characteristics were homogeneous. In the control group, for the characteristics of maternal age, gestational age, height, UAC, hemoglobin (Hb), albumin and erythrocytes, the results showed that there were no differences between the study samples in the control group, this means that these characteristics were homogeneous. For the case group, characteristics such as maternal age, gestational age, weight, height, BMI, systolic-diastolic, hemoglobin, albumin and erythrocyte did not differ between study samples. This shows that the descriptive characteristics of most of the research samples, both case and control groups, are homogeneous.

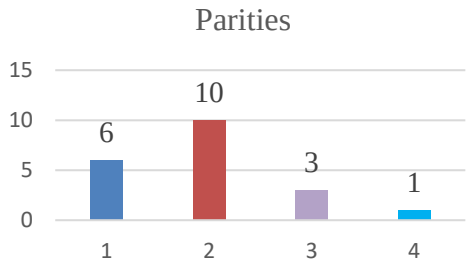

Figure 1. Research's Parities

In this study, the number of parity observations was carried out and obtained samples with parity 1 as many as 6 people (30%), parity 2 as many as 10 people (50%), parity 3 as many as 3 people (15%) and parity 4 as many as 1 person.[5]

Table 2. Comparative test of research's characteristics

No	Description	Mean ± Std. Deviation Cases (CED)	Mean ± Std. Deviation Normal	p
1.	Maternal Age	26.60 ± 5.700	26.10 ± 5.466	0.844
2.	Gestational Age	23.40 ± 1.075	23.70 ± 1.160	0.556
3.	Weight	51.60 ± 6.041	62.40 ± 7.336	0.004
4.	Height	152.40 ± 4.115	152.10 ± 3.843	0.868
5.	BMI	22.2390 ± 2.74345	26.9497 ± 2.71765	0.003
6.	UAC	20.30 ± .949	27.00 ± 1.764	<0.0001
7.	Systolic	106.00 ± 6.992	114.00 ± 5.164	0.010
8.	Diastolic	71.60 ± 7.531	77.00 ± 4.830	0.075
9.	HB	11.1100 ± 1.16662	10.5300 ± 2.24304	0.478
10.	Albumin	4.2600 ± .45753	4.5500 ± .47900	0.183
11.	ERY	4.4020 ± .90460	3.9980 ± .90626	0.332

In this study the researchers examined vitamin D from both study groups. The results of the case and control study were 33,5380 ± 5,60498 vs. 32,4300 ± 4.40708; p: 0.166. These results indicate that there is no significant difference between the two study groups. From these results it was found that the two research groups showed low values or were brought to normal levels. This study also analyzed the ferritin levels of the two study groups. The results between the two study groups showed 17.4080 ± 10.90625 vs. 24.7420 ± 21.79586; p: 0.388. These results indicate that there is no difference in ferritin levels between the two study groups.

Table 3. The analysis of Vitamin D and Ferrtin Correlation Test

	Case	Control		
VIT D	33.5380 ± 5.60498	32.4300 ± 4.40708	p = 0,166	p = 0,030
FERITIN	17.4080 ± 10.90625	24.7420 ± 21.79586	p = 0,388	r = 0,486

This study sought the relationship between vitamin D in pregnant women with both CED and normal with ferritin levels, so as to determine whether vitamin D had a correlation with ferritin levels. The results of the analysis of these two variables show that the results are p: 0.030, which means that there is a correlation between the two variables. These results also showed an r value of 0.486, which means a decrease in vitamin D was associated with a decrease in ferritin with a strength of 0.486 times (48.6%).

Table 3. The analysis of Vitamin D and upper arm circumference Correlation Test

	Case	Control		
VIT D	33.5380 ± 5.60498	32.4300 ± 4.40708	p = 0,166	p = 0,730
UAC	20.30 ± .949	27.00 ± 1.764	P = 0,167	r = -0,082

Table 4. The analysis of Ferritin and upper arm circumference Correlation Test

	Case	Control		
FERITIN	17.4080 ± 10.90625	32.4300 ± 4.40708	p = 0,388	p = 0,304
UAC	20.30 ± .949	27.00 ± 1.764	P = 0,167	r = 0,362

This study was conducted to determine the comparison of the characteristics of normal pregnant women with CED pregnant, the comparison of Vitamin D in normal pregnant women with CED pregnant, the comparison of ferritin in normal pregnant women with CED pregnant and the relationship of Vitamin D with ferritin in normal pregnant women and CED pregnant women. Based on the characteristics of patients with mean values (mother's age, gestational age, weight, height, BMI, UAC, systolic, diastolic, Hb, albumin and erythrocytes), where in normal pregnant women no differences were found between samples indicating homogeneous nature, whereas in CED pregnant women found differences in systolic between samples and for maternal age, gestational age, weight, height, BMI, UAC, systolic, diastolic, Hb, albumin and erythrocytes had no difference. Based on the comparison of characteristics between normal pregnant women and CED pregnant women, it was found that maternal age (26.60 ± 5.700 vs. 26.10 ± 5.466; p = 0.844), gestational age (23.40 ± 1.075 vs. 23.70 ± 1.160; p = 0.556), body weight (51.60 ± 6.041 vs 62.40 ± 7336; p = 0.004), height (152.40 ± 4.115 vs 152.10 ± 3,843; p = 0.868), BMI (22.2390 ± 2.74345 vs. 26.9497 ± 2.71765; p = 0.003), UAC (20.30 ± .949 vs. 27.00 ± 1.764; p < 0.0001), systolic (106.00 ± 6.992 vs. 114.00 ± 5.164; p = 0.010), dyastolic (71.60 ± 7.531 vs. 77.00 ± 4.830; p = 0.075), Hb (11.1100 ± 1.16662 vs. 10.5300 ± 2.24304; p = 0.478), albumin (4.2600 ± .45753 vs. 4.5500 ± .47900; p = 0.183) and erythrocytes (4.4020 ± .90460 vs. 3.9980 ± .90626; p = 0.332), there were no significant differences in some aspects, except for weight. Body weight, BMI, UAC and systolic were found to be significantly different. This shows that there is a difference between the weight of pregnant women with cake and normal pregnant women. The results showed that almost all pregnant women with cake were lower than normal pregnant women.

In the comparative analysis of Vitamin D between normal pregnant women and CED pregnant women, there are still no similar studies, so based on the results of the research we have done, the results of p = 0.166 indicate that there is no significant difference and the results are found to be low or below normal levels. In a study related to the comparison of Vitamin D in critically ill and non-critically ill children by Sri Utami, Alex Chairulfatah and Kusnandi Rusmil (2015) it was found that the difference in Vitamin D p < 0.001 showed a significant comparison with a negative correlation (r = -0.674) in critical and non-critical illnesses. Research related to Vitamin D profile in adult asthmatic and non-asthmatic patients in Surabaya by Rivan Virldano Suryadinata, Amelia Lorensia and Anugrah Putri Aprilia (2017) found that the comparison of Vitamin D p < 0.05 showed a significant difference between asthma and non-asthma.[9–11]

In the comparative analysis of ferritin between normal pregnant women and CED pregnant women, there is still no similar study, so based on the results of the research we have done, the results of p = 0.388 show that there is no significant difference. In a study related to the comparison of ferrum and ferritin pre and post hemodialysis in patients with chronic kidney disease at RSUP Dr. Hasan Sadikin Bandung by Intanri Kurniati (2019) found a ratio of ferritin p < 0.05 which indicates a significant difference between pre and post hemodialysis. In a study related to differences in serum ferritin in patients with -thalassemia major who experienced hypothyroidism and euthyroidism by Burhan, Susi Susanah and Sri Sudarwati (2017), the results of the comparison of ferritin p = 0.443 showed no significant

difference between those who were hypothyroid and euthyroid.[12]

In the analysis of the relationship between vitamin D and ferritin in normal pregnant women and pregnant women with CED, no similar studies have been found, so that based on the results of the research we have done, the results of p = 0.030 show a significant relationship with a positive relationship, where there is no difference when vitamin D is high. Ferritin is also high as well as when it is low. In a study related to the relationship between ferritin levels and serum levels of 25-hydroxycholecalciferol {25(OH)D} patients with thalassemia major in children by Tubagus Ferdi Fadilah, Sri Endah Rahayuningsih and Djatnika Setiabudi (2012), the correlation between ferritin and Vitamin D p < 0.01 showed significant relationship in pediatric thalassemia major patients. This study shows that vitamin D compliance has a relationship with a decrease in ferritin, so it can be concluded from this study that a decrease in ferritin in pregnant women with constipation has the effect of low vitamin D.[13,14]

CONCLUSION

From this study it was found that mothers pregnant with CED shows decreased levels of Vitamin D and decrease in ferritin. After the correlation was analyzed, it found that decreased vitamin D associated with decreased ferritin in women pregnant with CED.

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