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FEATURES OF THE COURSE OF PREGNANCY IN WOMEN WITH DIFFERENT LEVEL OF VITAMIN D

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Relevance. Most women during pregnancy can experience both a lack and a deficiency of vitamin D. To protect against all kinds of burdens during pregnancy, vitamin D is used. This vitamin occupies one of the leading positions for the optimal course of pregnancy.During pregnancy, there is adirect relationshi p between the level of vitamin D in the mother and the development of the fetus. [1,2].

2015 *Andersen LB* study , "… deficient vitamin D levels in pregnant women were associated with an increased risk of miscarriage. Of the surveyed 1683 women, pregnancy ended in miscarriage in 58 women. The mean vitamin D level in this group of women was significantly lower (22.2 ng/mL) than among 1625 women who had a normal pregnancy (26.4 ng/mL). With vitamin D deficiency (<20 ng/ml), miscarriages occurred 2.5 times more often than with sufficient levels of vitamin D" [3].

The results of the scientific work of the scientist Moller U. _ K , which covered 153 females and had its first publication in 2017, proved that the presence of low concentrations of vitamin D during the first trimester entails an increased risk of miscarriage during the second trimester [6].

According to a Cochrane meta-analysis conducted by De Regil in 2016, consisting of a three-stage, randomized, carefully controlled trial (RCT), "…Vitamin D supplementation during pregnancy reduced the risk of preterm birth by 63.6%. Studies were conducted among 477 women. Among them, the vitamin D group had a 3.6% chance of preterm birth, and the group without vitamin D therapy had a 9.9% chance of preterm birth " [5].

According to the conclusions that were obtained in the study by *Bodnar L.* "...in 2015 r. among 3453 women, the probability of preterm birth averaged 8.6%. At the same time, the risks of preterm birth increased in women with low vitamin D levels. risks increased by 31%. In contrast, in the group with normal vitamin D levels (>30 ng/mL), the risks were significantly lower at 7.3%. Thus, the probability of preterm birth in the group with vitamin D deficiency is about 55% higher than in the group with sufficient vitamin D levels" [4].

Based on the results of scientific research, it was found that an increased content of vitamin D helps to reduce the likelihood of developing PR. the results of this analysis are also based on previous scientific work.

The purpose of the study : to assess the course of pregnancy depending on the level of vitamin D.

Materials and Methods . An analysis was made of the concentration of vitamin D in 503 female representatives during pregnancy, the terms of which varied from 6 to 24 weeks.

Depending on the content of vitamin D, pregnant women were divided into subgroups:

Subgroup 1 consisted of 177 pregnant women with vitamin D deficiency (46.6%), which corresponds to a 25(OH)D level below 20 ng/ml;

Subgroup 2 consisted of 203 pregnant women (40.4%) with vitamin D deficiency, which corresponds to a level of 21-29 ng/ml.

In other cases (123/503; 24.4%) of pregnant women had the normative content of vitamin D in the blood (over 30 ng/ml).

Each analysis included the calculation of vitamin D concentration. Vitamin D concentration was calculated using the ELISA method using the Elecsys -2010 apparatus manufactured in Switzerland. Based on the M criteria . Hollick (2005) carried out a procedure for determining the concentration of vitamin D in blood serum.

The optimal values of vitamin D concentration were equal to 30 ng/ml in blood serum in the presence of 25(OH)D levels. Vitamin D deficiency was defined as a decrease in the concentration of this vitamin below 20 ng/ml (50 nmol/l) in the blood serum at a level of 25(OH)D, while deficiency was recorded when the level of vitamin D in the blood serum was not higher than 21-29 ngr/ml.

Statistical studies were carried out through the use of such specialized programs as: " Statistica for Windows » (version 6.1) based on the methods of parametric and non-parametric statistical basis (Student, Mann-Whitney metrics).

Results of the study: in the course of this scientific work, we did not find significant differences in the concentration of vitamin D, depending on the past pregnancies. The number of pregnancies experienced does not have strong statistical effects ($p < 0.05$), which provides a basis for comparing primiparas with multiparous women.

At the time of the study, the duration of pregnancy in the studied women varied from 8 to 22 weeks, the average values were 14.7 ± 3.7 weeks in the first group, while in the second group the average values were 13 ± 4 and 13.4 ± 2.9 in the control group, respectively. The number of women whose gestational age at the time of the study was 12 weeks was 42% (172 representatives), while persons whose gestational age exceeded 12 weeks was equal to 58% (238 subjects).

The value of different gestation periods in the studied women has no effect ($p>0.05$) on the statistical result, which makes it possible for us to compare all available female representatives.

There is a direct effect of vitamin D concentration on the likelihood of developing pathologies of an infectious nature (RR = 1.2; 95% CI: 1.023-1.41, $p <0.05$). The probability of developing infectious processes in the first group, which has a vitamin D deficiency (<20ng/ml), exceeds 1.2 times relative to these values relative to the representatives of the second group with vitamin D deficiency (<30ng/ml), while the data values are 2.8 times higher than those with optimal vitamin D levels (RR=2.78; 95% CI: 1.65-4.69; p=0.05). It is worth emphasizing the fact that high rates of infectious nature in representatives of the first and second groups had a bacterial-viral flora in 43% (76) cases in the first group ($\chi 2=15.13$; F =0.0005; p<0, 05), while these values in the second group are 23% (47 people) ($\chi 2=6.68$; F =0.0124; p<0.05) relative to the control groups.

The bacterial and viral flora mainly consisted of representatives of Mycoplasma genitalium , Ureaplasma urealibcum, Chlamydia trachomatis localized in the cord of the cervical region, it is also worth noting the presence of representatives of bacterial vaginosis and Candida albicans . A positive result for the presence of representatives of viruses was noted in the presence of IgM in the blood of females during pregnancy. It should be noted that the presence of opportunistic pathogenic flora in the control group was noted in 36.5% of cases (11 people).

Due to the fact that the viral status has a significant impact on the course of pregnancy, we calculated the ratio of vitamin D concentration and the level of viral status in the subjects during pregnancy.

When analyzing the microflora of the vagina during pregnancy, a variety of this flora was found, starting from the classical representatives of the flora and ending with conditionally pathogenic microorganisms. According to the results of the study of the vaginal microflora of the representatives of the first group, Staphylococcus aureus was detected in 7.7% of cases (the concentration of colonies 6 = 0.8 lg KOE /g) ($p<0.05$), while enterococci were sown in 16.5% of cases (colony concentration 3.7 ± 0.2 lg KOE /g) .

It should be noted that in the representatives of the second group, Staphylococcus aureus was detected in 4% (the concentration of colonies was 6.4 ± 0.5 lg CFU /g). It is worth noting the sowing of eubacteria in 1.4% of cases, the concentration of colonies is 4.4 ± 0.2 lg cfu/g

The value of the average vaginal contamination of the persons of the first group was equal to 5.4 ± 0.3 lg CFU/g, while these indicators in the second group were equal to 4.7 ± 1.1 lg CFU/g, and in the control group 4.6 ± 1.1 lg CFU/g, which gives grounds for asserting an increased concentration of pathogenic flora in the presence of vitamin D deficiency in the body.

As a result, we get higher values of vaginal contamination of the subjects with vitamin D deficiency relative to individuals with optimal values and representatives of the second group.

Among the representatives of the first group, 35.5% (135 people) underwent outpatient treatment. In 16% of cases, the preservation of pregnancy was not possible. Among those with interrupted pregnancy, 9.2% (35 patients) had a pathology of a non-developing fetus, while spontaneous abortion occurred in 6.6% of cases, which left 25 people. After registering this condition, the product of conception was removed from the uterine cavity. The average gestational age was 11.8 weeks.

The study revealed a direct effect of the concentration of vitamin D on the course of pregnancy. At pregnant women belonging to the first subgroup with the presence of vitamin D deficiency, an interruption of the pregnancy period is noted: in 23.7% of cases (42 patients) relative to the second subgroup, the interruption of the pregnancy period was detected in 18 representatives of whose gestational age was equal to the 8th week ($\chi 2 = 5.78$; $F = 0.022$; $p<0.05$). Representatives of the control group in all cases had an optimal course of pregnancy.

According to the results of the study, when comparing the probabilities of premature termination of pregnancy, a pattern was noted that pregnant women with vitamin D deficiency are 9 times more likely to have an abortion compared to those with vitamin D deficiency (OR 9.11; 95% CI: 1.11-74.84 , $p <0.05$).

D deficiency included in the second subgroup ($\chi 2 =29.9$; $p<0.01$), and also 6 times higher compared to the control group ($\chi 2=77.3$; $p<0.01$).

The burdens of the pregnancy period consisted of CI, GDM, hystational decrease in thyroid function, increased values of blood clotting before natural thickening.

Significantly more often in the first group, the presence was noted : an increased chance of premature termination of pregnancy during the first trimester in 35% of cases, which amounted to 62 patients (62/177; $p<0.05$), it is worth noting that these values during the second trimester were noted in 81 (45.8%; 81/177; $p<0.05$) pregnant women, low placentation - in 76 (42.9%; 76/177; $p<0.05$) pregnant women, retrochorial hematomas - in 30 (16, 9%; 30/177; $p<0.05$), as well as acute respiratory pathology during the first part of the pregnancy period in 62 (35%; 62/177; $p<0.05$) of the studied. While in the control group, the likelihood of developing isthmic-cervical insufficiency, the development of retrochorial hematoma, gestational diabetes mellitus, decreased thyroid function was not observed, other pathologies occurred in small quantities.

It should be noted that the representatives of the second group had all types of weights in small quantities relative to the first subgroup. The strongest burden was the probability of interruption of the pregnancy period ($\chi 2=6.8$; $p<0.01$).

Considering the wide range of effects of vitamin D and the large number of burdens for females during pregnancy and the product of conception itself, we carried out a study of long periods of pregnancy in existing groups .

The results of the study proved a high probability of preterm labor in the presence of vitamin D deficiency ($\chi 2=4.2$; $F =0.047$; $p<0.05$).

The analysis of the correlation type revealed a direct effect of the concentration of vitamin D on the final result of the pregnancy period, and a relationship was also found between the concentration of this vitamin and the successful completion of this period ($\tau = 0.3$; $p < 0.05$), premature birth ($\tau = -0.26$; $p<0.05$) and by caesarean section ($\tau = -0.23$; $p <0.05$).

The results of the analysis are substantiated by information from various scientific sources and are based on the fact that vitamin D controls the formation of neutrophils and cytokines, which optimizes anti-inflammatory processes and stimulates the protective mechanisms of the human body.

Research on the effects of vitamin D deficiency has been based on neonatal weight and height data. The average values did not have significant differences and were equal to 3400 ± 112g in the representatives of the first subgroup, 3370 ± 130g in the second group, and 3340 ± 85g in the control group. It is worth noting that in an individual assessment of these values, a high variation in weight and height values was noted in newborns whose mothers had vitamin D deficiency.

This study provides the basis for the mandatory prescription of therapy aimed at combating vitamin D deficiency from the first trimester of pregnancy.

Conclusions :

1. course of pregnancy has been proven, so with its deficiency, the risk of abortion is 9 times more likely in relation to pregnant women with vitamin D deficiency (OR 9.13; 95 % CI: 1.14-74.86 , p <0.05) .
2. Correlation analysis made it possible to establish a direct relationship between vitamin D deficiency and term delivery ($\tau = 0.3$; $p < 0.05$) and an inverse relationship with preterm birth ($\tau = -0.26$; $p < 0.05$) and delivery by caesarean section ($\tau = -0.23$; $p < 0.05$) .

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