# CHANGES IN ANTHROPOMETRIC INDICATORS OF THE FETUS IN MOTHERS WITH HYPOTHYROIDISM

**Norbek K. Niyozov**
*Tashkent state medical university (Tashkent, Uzbekistan)*
norbek8791@gmail.com.

***Abstract****. The physiological role of thyroid hormones is very important and diverse in all periods of human life, including during pregnancy. Hypothyroidism in pregnant women can negatively affect fetal development, leading to low birth weight, antenatal death, or other conditions. We studied 50 healthy and 72 hypothyroid fetuses. All pregnant women underwent I, II, and III screening examinations. The lowest growth rate of fetometric indicators was observed in the third screening period. The highest growth rate of fetometric indicators was determined in the period from 12 to 35 weeks.*

***Keywords:*** *hypothyroidism, fetometry, screening examination, thyroid gland*

**Introduction.**

The incidence of thyroid pathologies in the world has increased by 12.1%: from 2037.1 cases per 100 thousand population to 2283.5. The curve showing the number of patients with thyroid problems has been steadily increasing for more than a decade [1, 2, 11, 15, 21]. According to the World Health Organization, thyroid diseases are caused by iodine deficiency in the body in 65% of cases in adults and 95% in children, and a number of scientific studies are being carried out to prevent them. In this regard, "..in conditions of iodine deficiency in the environment, the impact of these diseases on the health of the population is high, and thyroid diseases affect 2847 patients per 100 thousand adult population. Thyroid dysfunction has a negative impact on the course of pregnancy. In turn, pregnancy also affects the functioning of the thyroid gland…" Hypothyroidism in the fetus and neonatal period causes impaired mental and physical development of the child born [3, 5, 9, 20, 22]. This defect can reach the level of endemic cretinism. Therefore, studies aimed at thyroid insufficiency are of particular scientific and practical importance.

There are many unresolved issues in the problem of assessing anthropometric parameters of hypothyroidism in newborns. To date, the effect of embryonic hypothyroidism on the subsequent development of the child has not been established. According to a number of researchers, transient hypothyroidism is a dangerous form of this disease, requiring hormone therapy. Other authors do not consider it appropriate to recommend thyroid hormones for gestational hypothyroidism [4, 6, 10, 19, 23]. More than 99% of thyroid hormones circulating in the blood are bound to proteins and do not show activity. Less than 1% of them (free T3, free T4) are in free form, providing the biological effect of the thyroid gland [7, 12, 14, 18]. The absorption of iodine through the placenta into the fetus and the increase in metabolic processes during pregnancy, along with the synthesis of thyroid hormones, increase the need for iodine in women during pregnancy. At the same time, increased urinary iodine excretion, increased conversion of thyroxine in the placenta, and the weakening of its effect all these together lead to a deficiency of iodine and thyroid hormones [8, 13, 16, 17]. This causes an increase in the size of the thyroid gland. A number of scientific studies are being conducted in the world to improve the changes in anthropometric indicators of the fetus of a mother with hypothyroidism. In this regard, studies aimed at scientifically substantiating the correlation between the amount of thyroid hormones in the mother's blood and the child's fetometric indicators in healthy pregnant women at the first 12–15 weeks of screening, the second at 20–25 weeks, and the third at 30–35 weeks of pregnancy are of particular scientific and practical importance.

Assessment of changes in the dynamics of the main indicators of fetal anthropometric development in healthy and hypothyroid pregnant women using ultrasound examination

**Material and methods of research.**

The materials and methods of the study, which was carried out on the basis of the Dr. Aliyev Center for Diagnostics of Mother and Child in Tashkent, as well as the 1st Central Consultative Diagnostic Polyclinic under the Presidential Administration of the Republic of Uzbekistan, are described. To achieve the set goals and objectives, the research work was carried out in the 1st Central Consultative Diagnostic Polyclinic, where the results of the examination of 100 healthy pregnant women on the gynecologist's list and 126 pregnant women with hypothyroidism on the endocrinologist and gynecologist's list were obtained. The organization of the study consisted of 4 consecutive stages.

At the first stage, the selection of all pregnant women was strictly controlled. In this case, all pregnant women were in the age group from 20 to 35 years old, with a body weight of 60 kg to 80 kg. Their anamnesis data were collected, and women in the first labor period without concomitant diseases, with a single fetus, were selected.

In the second stage, all pregnant women were divided into 3 groups: the first group, a group of healthy pregnant women (control); the second group, a group of pregnant women who were diagnosed with hypothyroidism from the first pregnancy, were under constant endocrinological supervision, and received levothyroxine at a dose of 50 mcg from the early stages of the disease (first group); the third group, a group of pregnant women who were monitored and diagnosed with hypothyroidism when they came to the Kibray district association of Tashkent region with complaints to the endocrinologist and gynecologist at different stages of pregnancy, and who began taking levothyroxine at a dose of 50 mcg at different stages of pregnancy (second group). In the third stage, the main fetometric dimensions of the fetus were measured using ultrasound diagnostics at the stages of examination of pregnant women at 12–13 and 14–15 weeks (first screening), 20–21 weeks, 22–23 weeks, and 24–25 weeks (second screening), and 30–31 weeks, 32–33 weeks, and 34–35 weeks (third screening). In the fourth stage, using the data on the main fetometric dimensions of the fetus, a mathematical statistical analysis of the dynamics of absolute growth and intensive growth, as well as the cephalic index and proportional body indices, was carried out.

In total, 3 (1.4%) of the fetuses of the second group of pregnant women with hypothyroidism were observed to have several anomalies. In one of them, renal pyeloectasia (in the left kidney) was observed, in one pregnant woman aneuploidy was observed, and in one pregnant woman a miscarriage occurred. We decided not to include these cases in our statistical analysis results.

In the research work, the biparietal, frontal-occipital, head circumference, abdominal circumference, and femoral length dimensions of healthy pregnant women were studied. The measurements of the fetuses of pregnant women were carried out on the basis of the Dr. Aliyev Center for Maternal and Child Diagnostics in Tashkent. Measurement of the biparietal size using ultrasound diagnostics is carried out in a transverse section of the fetal head. The measurement is determined from the upper contour of the pubic bone to the inner surface of its lower contour. In the same plane, the head circumference is measured along the outer contour. After the fetal abdominal circumference has a rounded shape, the fetal abdominal circumference is measured by clearly visualizing the umbilical vein located in the transverse section through the anterior abdominal wall and the 1/3 of the spine. The length of the fetal femur is measured along the maximum length of its classified diaphysis.

All fetometric examinations were performed on the LOGIQ C 5 Premium device with a 5–12 MGS disposable sensor. Fetometric examination protocols included the following information:

1.Protocol number.

2.Card number.

3.Year of birth of the I.F.O.

4.Anamnesis data.
5.Clinical diagnosis.
6.Screening observation period.
7.Results of thyrotropin and free T3, T4 hormones in the mother's blood.
8.Fetal week.
9.Fetometric parameters.

Analysis of serum thyrotropic hormone, free triiodothyronine, and thyroxine samples from pregnant women was measured directly using chemiluminescent parametric technology. The ECLIA chemiluminescent immunoassay was used on Cobas e immunochemical analyzers. Determination of thyrotropic hormone in maternal blood is the main indicator in the diagnosis of thyroid dysfunction. Even small changes in the concentration of free thyroid hormones lead to opposite changes in the level of thyrotropic hormone. The measurement range was 0.005–100 μg/ml. In order to determine the daily rhythm of thyrotropic hormone in maternal blood, fasting maternal serum was taken and tested in the laboratory.

Analysis for thyrotropic hormone should be performed in the morning, after a full night's sleep. Collection of biomaterial (venous blood serum) for analysis is carried out on an empty stomach (before breakfast).

The level of thyrotropin hormone during pregnancy is as follows:

I trimester: 0.1–2.5 μg/ml

II trimester: 0.2–3.0 μg/ml

III trimester: 0.3–3.0 μg/ml. All results were analyzed according to these data.

To assess the dynamics of development, age morphology indicators were calculated: absolute growth (MO'), and intensive growth (IO'). Absolute growth (MO') is determined as the difference between the absolute values given in relation to previous periods according to the following formula:

$MO' = D2 - D1$ (1)

Here, D2 is the absolute value of a given period; D1 is the absolute value of the indicator of the previous period.

The intensive growth rate (IR) of fetometry indicators is determined by the following formula:

$IR = (D2 – D1) / 0.5 (D1 + D2) \times 100\%$ (2)

It is used to determine the average value (in percent) of a given period relative to the total period under study. IR represents growth intensity, D2 is the absolute value of a given period, and D1 is the absolute value of the indicator of the previous period.

After measuring the fetometric dimensions of the fetus at different periods of screening, we studied the ratio of fetometric indicators in order to determine the proportional development of the fetal body parts. For this, the cephalic index was used to determine the shape of the fetal head. The cephalic index is the ratio of the biparietal volume of the head to the frontal-occipital volume. The following formula was used to determine this indicator:

$BP/FO \times 100\%$ (3)

The normal cephalic index is defined as the range of 75–80%. If the value of the cephalic index is less than 71%, the fetus may develop dolichocephaly, and if it is more than 85%, brachycephaly may develop. It occurs when the mesocephalic size of the head is from 71% to 85%.

In order to determine the correct prenatal physical development of the fetus, the ratio of abdominal circumference to head circumference and the ratio of abdominal circumference to thigh length were determined.

For mathematical processing of the data, the arithmetic mean (M), the mean error of relative values, and the t-difference reliability coefficient were estimated by Student's t-test.

**Results and discussion.**

When examining the biparietal dimensions of the fetal head of healthy pregnant women, it was found that the intensive growth rate of the biparietal dimension from 12–13 weeks to 14–15 weeks during the first screening period was on average 34%. Another fetometric indicator of the fetal head size is the frontal-occipital dimension. During the first screening period, it was noted that the intensive growth rate of the frontal-occipital dimension from 12–15 weeks in the fetus of healthy women was 38%. Another criterion for assessing the development of the fetal skull is the head circumference. During the first screening period, the intensive growth rate of the head circumference of healthy pregnant women from 12 to 15 weeks was 48%. In the fetuses of healthy pregnant women, the intensive growth rate of the abdominal circumference during the first screening period was 17% for 12–15 weeks. In the first screening period, the intensive growth rate of the femur length of healthy women was 31% on average for the period from 12 to 15 weeks. In the second screening period, the growth intensity of the biparietal index of the fetuses of healthy pregnant women was 74% for the period from 20–25 weeks. From 20–21 weeks to 22–23 weeks, the absolute growth rate of the biparietal index of the fetal head increased by 32% in healthy women. The absolute growth of this indicator of the fetus by 24–25 weeks was 38%. It was found that in the second screening periods, i.e., 20–21 weeks, 22–23 weeks, and 24–25 weeks, the fetal biparietal index was more intensive than in the first screening period. From the first screening period, i.e., 15 weeks, to the second screening period, i.e., 20 weeks, the intensive growth rate of the biparietal size was 48%.

In the second screening period, the absolute growth rate of the frontal-occipital size in the fetuses of healthy pregnant women was 31% from 20–21 weeks to 22–23 weeks, and by 24–25 weeks, we can see that the absolute growth rate of the frontal-occipital size increased by 34%. During this period, the intensive growth rate of the frontal-occipital size was 78%. In the second screening period, the frontal-occipital size in the fetuses of healthy pregnant women increased more rapidly than in the first screening period.

It was found that the head circumference of the fetuses of healthy pregnant women increased statistically ($r<0,05$) more rapidly in the second screening period, that is, in the 15th–20th week, and the intensive growth rate from the first screening to the second screening period was 49%. It was found that the absolute growth rate of the fetal head circumference in healthy women at 22–23 weeks was 33% compared to 20–21 weeks. The absolute growth rate at 24–25 weeks was 21,7%. The intensive growth rate during this period was 60,7% from 20 to 25 weeks. In all periods of the second screening observation, a significant increase in the size of the head circumference was observed compared to the first screening periods.

Abdominal circumference is one of the standard indicators of fetometry, allowing us to assess the anthropometric indicators of the fetal body. In the second screening period, the intensive growth rate compared to the first screening period (15–20 weeks) was 56%. The absolute growth rate of the fetal abdominal circumference in healthy women from 20–21 weeks to 22–23 weeks was 38%. At 24–25 weeks, the absolute growth rate was 40%. During this period, the intensive growth rate was 92,5% from 20 to 25 weeks. A significant increase in the size of the abdominal circumference was observed in all periods during the second screening observation compared to the first screening periods.

The absolute increase in femoral length of healthy pregnant women in the second screening period, i.e., from 20–21 weeks to 22–23 weeks, was 57%. The absolute increase in femoral length of healthy pregnant women from 22–23 weeks to 24–25 weeks was 23%. In the second screening period, the intensity of femoral growth was 39% from 20 to 25 weeks. In the third screening period, the absolute increase in biparietal size from 30–31 weeks to 32–33 weeks was 2,7%. The absolute increase in biparietal size from 32–33 weeks to 34–35 weeks was 5,6%. During the third screening observation period, it was noted that for the biparietal size indicator, which has a specific size, in the fetus of healthy women from 30 to 35 weeks of gestation, an intensive growth rate of 8,5% was recorded.

From the second screening period to the third screening period at 30–31 weeks, the intensive growth rate of the frontal-occipital size was 7%. From 30–31 weeks to 32–33 weeks, the absolute growth rate was 4%. From 32–33 weeks to 35–36 weeks, the absolute growth rate was 5%. In the third screening period, the intensive growth rate of the frontal-occipital size was 8,3% from 30–35 weeks.

The absolute increase in head circumference in healthy women from 30–31 weeks to 32–33 weeks was 8,2%. The absolute increase in head circumference in healthy women from 32–33 weeks to 35–36 weeks was 3,7%. It was found that the intensive increase in head circumference in healthy women from the second screening period to the third screening period was 19,4%.

During the third screening period, it was noted that the intensive growth rate of the abdominal circumference of healthy women was 25%, with absolute growth rates of 13% from 30–31 weeks to 32–33 weeks and 11,5% from 32–33 weeks to 35–36 weeks.

During the third screening period, it was found that the intensive growth rate of the femur length of healthy women was 51%. Absolute growth rates were 4,3% from 30–31 weeks to 32–33 weeks and 2,8% from 32–33 weeks to 35–36 weeks.

It was noted that the intensive growth rate of the biparietal size of the fetus of the first group of women with hypothyroidism was 25% on average from 12 to 15 weeks, while in the control group it was 34%. In the first group of women with hypothyroidism, the intensive growth rate of the frontal-occipital size was found to be 54% on average from 12 to 15 weeks. In the control group, this figure was 38%. It is noteworthy that the frontal-occipital size of the first hypothyroid group was slightly larger than that of a healthy fetus. In the first group of women with hypothyroidism, the intensive growth rate of the head circumference was found to be 38% on average from 12 to 15 weeks, while in the control group, the head circumference was 48% at the time of the first screening. In the first group of women with hypothyroidism, the intensive growth rate of the abdominal circumference was noted to be 10% on average from 12 to 15 weeks.

It was observed in the control group that it was equal to 17%. In the first screening period, the intensive growth rate of the femur was 18% from 12 to 15 weeks, and in the control group it was 31%. In the second screening period, the intensive growth rate of the biparietal size was 14% from 20 to 25 weeks. In the same period, it was found that in the control group it reached 83%. In the second screening period, we can see that the biparietal size in the first group of hypothyroid patients was larger than that of a healthy fetus. At 20–21 weeks, the absolute increase in the biparietal index of the fetal head was 29% compared to 14–15 weeks. At 22–23 weeks, the absolute increase in the biparietal index of the fetal head in the first group of women with hypothyroidism was 64% compared to 21 weeks. At 24–25 weeks, it was 30% compared to 23 weeks. During this period, the intensive growth rate of the frontal-occipital size was 82% from 20 to 25 weeks. It is known that in the control group, the growth rate during this period was 78%. It was also found that the frontal-occipital size of the first hypothyroid group was slightly larger than that of a healthy fetus during the first screening period. During the second screening period, it was found that both the frontal-occipital and biparietal sizes were larger than those of the fetuses of healthy pregnant women. During the second screening period, the intensive growth rate of head circumference was 48% from 20 to 25 weeks. In the control group, the intensive growth rate during this period was 61%. During the second screening period, the head circumference of the first group of women with hypothyroidism statistically increased, and the intensive growth rate was 69%. The absolute growth rate from 20–21 weeks to 22–23 weeks was 21%. At 24–25 weeks, the absolute growth rate was 22%. During the second screening period, the intensive growth rate of abdominal circumference was 81% from 20 to 25 weeks in the group of pregnant women with the first hypothyroidism and 92,5% in the control group. The absolute increase in fetal abdominal circumference from 20–21 weeks to 22–23 weeks in the first group of women with hypothyroidism was on average 35%. At 24–25 weeks, the absolute increase was 34%. During this period, the intensive growth rate of the femur was 39% from 20 to 25 weeks. It was statistically

confirmed that the control group had an intensive increase of 81% during the same period. The length of the femur of the fetus in pregnant women with hypothyroidism (first group) was statistically significantly higher than that during the second screening, that is, at 20–21 weeks, the absolute increase was 39%, and at 24–25 weeks, the absolute increase was 56%. In the third screening period, the intensive growth rate of the biparietal size was 20% in the period from 30 to 35 weeks. In the control group, in the same period, that is, in the third screening period, the intensive growth rate of the biparietal part of the head was 8,5%. In the second screening period, the biparietal indicator was also found to be higher. From 30–31 weeks to 32–33 weeks, the absolute growth rate was 8%. At 35–36 weeks, the absolute growth rate increased by 11% compared to the previous week. From 30–31 weeks to 32–33 weeks, the absolute growth rate of the frontal-occipital size was 16%. At 35–36 weeks, the absolute growth rate of the frontal-occipital size of the fetus was 6% compared to the previous week. The intensive growth rate of the fronto-occipital size in the period from 30 to 35 weeks in the first hypothyroidism group in the third screening period was 22%, but in the control group it was 8,3% in the same period. When the fronto-occipital size was observed in dynamics in the first hypothyroidism group, it was proven that it was larger than the head size of the control group in each screening period. The intensive growth rate of the head circumference in the first hypothyroidism group in the period from 30 to 35 weeks was 12%. In the control group, the intensive growth rate was 19,4% during this period. The absolute growth rate of the head circumference from 30–31 weeks to 32–33 weeks was 1,6%. The absolute growth rate of the fetal head circumference at 35–36 weeks was 6%. The intensive growth rate of the abdominal circumference from 30 to 35 weeks was 20%. In the control group, the intensive growth rate from 30 to 35 weeks was 25%. In the first group of women with hypothyroidism, the absolute growth rate from 30–31 weeks to 32–33 weeks was 11%. The absolute growth rate at 35–36 weeks was 8%. The intensive growth rate of the femur length during this period was 41%. In the control group, the intensive growth rate was 51%. The absolute increase in femur length was 20% from 30–31 weeks to 32–33 weeks and 17% at 35–36 weeks.

In the second group of pregnant women with hypothyroidism, it was proven that the biparietal dimensions of the fetal head were smaller than in the other two control groups. In the second group of women with hypothyroidism, the intensive growth rate of the biparietal dimensions was found to be 20% on average from 12 to 15 weeks. In the same period, the intensive growth rate in the first group of women with hypothyroidism was 25%, and in healthy pregnant women it was 34%. In the second group of women with hypothyroidism, the intensive growth rate of the fronto-occipital dimensions was found to be 27% on average from 12 to 15 weeks (54% in the first group and 38% in the control group). In the second group of women with hypothyroidism, the intensive growth rate of the head circumference was found to be 6% on average from 12 to 15 weeks. It was found that the abdominal circumference index in the first screening period was higher than this index in the first hypothyroidism group. During the first screening period, the intensive growth rate of the hip bone in pregnant women with hypothyroidism was 12% from 12 to 15 weeks. The rate of intensive growth during this period was 40% from 20 to 25 weeks. In the first group, intensive growth during this period was 11,4%, and in the control group, it was 83%. From 20–21 weeks to 22–23 weeks, the biparietal index of the fetal head in the second group of women with hypothyroidism had an absolute growth rate of 20%. The absolute growth rate at 24–25 weeks was 24% compared to 23 weeks. During this period, the intensive growth rate of the fronto-occipital size was recorded at 33% from 20 to 25 weeks. In the group of healthy pregnant women, the intensive growth rate during this period was 78%, and in the first hypothyroid group, the intensive growth rate of the fronto-occipital size was 82%. It is clear that compared to the other two control groups, this group had a very low growth rate, even during the period of rapid growth. The absolute growth rate at 22–23 weeks was 47% compared to 21 weeks. The absolute growth rate at 24–25 weeks was 13%.

During this period, the intensive growth rate of head circumference was 49% in the second hypothyroid group from 20 to 25 weeks. In the control group, the intensive growth rate during this period was 61%, while in the first hypothyroid group it was 48%. In the second screening period, the intensive growth rate of head circumference in the second group of hypothyroid patients compared to the first screening period was 5%. At 22–23 weeks, the absolute growth rate compared to 20–21 weeks was 27%. At 24–25 weeks, the absolute growth rate was 16% compared to 23 weeks. During this period, the intensive growth rate of abdominal circumference was 25% from 20 to 25 weeks. It was in the second screening period that we saw that growth was faster than in the other two periods, but in the second group of patients with hypothyroidism, growth was also very slow during this period (the intensive growth rate of healthy pregnant women was 92,5%, and in the first group of hypothyroidism, it was 81%). At 22–23 weeks, the absolute growth rate compared to 20–21 weeks was 3%. At 24–25 weeks, it was found that the absolute growth rate increased by 5% compared to 23 weeks. In the second screening period, the intensive growth rate of the femur was 27% from 20 to 25 weeks. During this period, the intensive growth rate was 81% in healthy pregnant women, while in the group of patients with hypothyroidism (the first group) it was 39%. At 22–23 weeks, the absolute growth rate increased by 10% compared to 20–21 weeks. From 24–25 weeks to 22–23 weeks, the absolute growth rate was 15%. In the third screening period, an intensive growth rate of 5% was noted in the biparietal size from 30 to 35 weeks. In healthy pregnant women, the intensive growth rate of the biparietal size during this period was 8,5%, and in the first group with hypothyroidism, it was 20%. The absolute growth rate was 2% from 30–31 weeks to 32–33 weeks and 3% from 32–33 weeks to 35–36 weeks. The intensive growth rate of the fronto-occipital size was recorded from 30 to 35 weeks, equal to 7%. In the control group, the intensive growth during this period was 8.3%, and in the first hypothyroidism group, it was 22%. The absolute growth pattern of the fronto-occipital size increased by 2% at 32–33 weeks compared to 31 weeks and by 4% at 35–36 weeks compared to 33 weeks.

During the third screening period, the second group recorded an intensive growth rate of head circumference from 30 to 35 weeks of gestation, equal to 11%. In the first hypothyroid group, the intensive growth rate during this period was 12%, compared to 19,4% in the healthy pregnant group. During the third screening period, when measuring head circumference, it was found that it increased intensively by 20% compared to the second screening period. During the third screening period, the absolute growth rate of head circumference in the second group of women with hypothyroidism increased by 3% from 30–31 weeks to 32–33 weeks and by 11% from 33 weeks to 35–36 weeks. The intensive growth rate of abdominal circumference in the second hypothyroid group was 5% from 30 to 35 weeks. In the first group of pregnant women with hypothyroidism, the intensive growth pattern was 20%, and in the healthy group, it was 25%. The absolute growth pattern from 30–31 weeks to 32–33 weeks was 11%, and from 32–33 weeks to 34–35 weeks, it was 5%. During this period, the intensive growth pattern of the femur was recorded in the second group of hypothyroidism, which was 15%, from 30–35 weeks. It was statistically confirmed that the intensive growth pattern in healthy pregnant women during this period was 51%, while in the group of hypothyroid women (the first group), it was 41%. In the third screening period, the absolute growth pattern of the femur was 10% from 30–31 weeks to 32–33 weeks and 17% from 32–33 weeks to 34–35 weeks.

The ratio of the biparietal size of the fetal head to the length of the femur is also an important diagnostic parameter (BP/SU). The ratio of the biparietal size of the fetus to the length of the femur of pregnant women in the first hypothyroidism group (up to 12–35 weeks) did not have a significant statistical difference when compared with the ratios of the control group. The ratio of the biparietal size of the fetus to the length of the femur of pregnant women in the second hypothyroidism group (up to 12–35 weeks) was found to be statistically smaller when compared with the ratios of the control group (see Table 1).

*Table 1.*

**Changes in the ratios of biparietal and femoral length (BP/SU) of the fetus in healthy and hypothyroid pregnant women at the stages of screening examinations**

| Periods | Weeks | Healthy pregnant group | People with hypothyroidism | Group 2 of people with hypothyroidism |
|---|---|---|---|---|
| 1 screening | 12-13 | 2,25 | 2,32 | 2,12 |
| | 14-15 | 1,92 | 1,75 | 1,75 |
| 2 screening | 20-21 | 1,53 | 1,42 | 1,40 |
| | 22-23 | 1,53 | 1,42 | 1,48 |
| | 24-25 | 1,51 | 1,38 | 1,37 |
| 3 screening | 30-31 | 1,52 | 1,37 | 1,34 |
| | 32-33 | 1,36 | 1,34 | 1,31 |
| | 34-35 | 1,3 | 1,31 | 1,29 |

In all other weeks, the ratio of fetal head circumference to abdominal circumference in the first hypothyroid group was statistically smaller than that in the control group. In the second screening period (24–25 weeks), the ratio of fetal head circumference to abdominal circumference in the first hypothyroid group was statistically smaller than that in the control group. When comparing the ratio of fetal abdominal circumference to hip circumference, a statistically significant increase was observed in the ratio of abdominal circumference to hip circumference in the first hypothyroid group compared to the ratio in the control group in the first and second screening periods (12–13, 22–23, 24–25 weeks). The ratio of abdominal circumference to hip circumference in the second hypothyroid group was statistically significantly smaller than that in the control group in all screening periods (12–35 weeks) (see Table 2).

*Table 2.*

**Changes in the ratios of fetal head circumference to abdominal circumference (HBC/HBC) and fetal abdominal circumference to femur length (HBC/HBC) in healthy and hypothyroid pregnant women during the stages of screening examinations**

| Periods | Weeks | Healthy pregnant group | | People with hypothyroidism | | Group 2 of people with hypothyroidism | |
|---|---|---|---|---|---|---|---|
| | | HBA/HQA | HQA/SU | HBA/HQA | HQA/SU | HBA/HQA | HQA/SU |
| 1 screening | 12-13 | 1,14 | 6,82 | 1,08 | 7,38 | 1,08 | 6,3 |
| | 14-15 | 1,13 | 5,89 | 1,13 | 5,7 | 1,23 | 3,7 |
| 2 screening | 20-21 | 1,16 | 4,49 | 1,14 | 4,64 | 1,07 | 3,5 |
| | 22-23 | 1,16 | 4,49 | 1,14 | 4,64 | 1,08 | 3,6 |
| | 24-25 | 1,14 | 4,49 | 1,08 | 4,6 | 1,11 | 3,3 |
| 3 screening | 30-31 | 1,12 | 4,47 | 1,11 | 4,35 | 1,03 | 3,3 |
| | 32-33 | 1,08 | 4,64 | 1,03 | 4,64 | 1,05 | 3,5 |
| | 34-35 | 1,05 | 4,5 | 1,05 | 4,53 | 1,06 | 3,3 |

**Conclusion.**

The most intensive period of absolute and intensive growth of the head size of the fetus of healthy women (20–21, 22–23, 24–25 weeks) coincided with the 2nd screening period. Two active periods of intensive growth of the femur were observed; these were 16–20 and 26–30 weeks, and statistically significant ($r<0,05$) data were obtained. The most intensive period of dynamic growth of the abdominal circumference coincided with the second screening period (20–25 weeks). Fetometric indicators of the fetus of women with hypothyroidism were statistically ($r<0,05$) smaller than those

of the fetus of healthy pregnant women in the second group. These changes were especially pronounced in the head and abdominal circumference of the fetus. These changes were recorded at 22–25 weeks of pregnancy. When comparing the ratios of fetometric data, it was found that this ratio was smaller in the fetuses of women with hypothyroidism; especially up to 20–30 weeks, this index was higher. The cephalic index of the fetuses of pregnant women of group 1 was more than 85% in the 2nd and 3rd screening periods, which can lead to the development of dolichocephalic children. The cephalic index of the 2nd group of women with hypothyroidism in the 3rd screening period was less than 74%, which may indicate the development of a shortened head, that is, brachycephaly. The ratio of abdominal circumference to head circumference was also smaller, forming a mixed type of change.

**REFERENCES**

1. Albu, D.–F. A Dandy – Walker variant prenatally diagnosed using ultrasound on one of the fetuses of a twin pregnancy obtained through in vitro fertilization /D.–F. Albu, C.–C. Albu, S.–D. Albu // International Journal of Medical Research and Review. - 2015. - Vol. 3, No. 3. - P. 127-131.

2. Bar – Yosef, O. Neurodevelopmental outcome of isolated ventriculomegaly: a prospective cohort study / O. Bar – Yosef, E. Barzilay, S. Dorembus [et al.] // Prenat. Diagn. - 2017. - Vol. 37. - P. 764-768.

3. Blinov, A.Yu. Fundamentals of ultrasonic fetometry / A.Yu. Blinov, M.V. Medvedev. - M.: Real Time, 2012.-- 136 p.

4. Carseldine, W. Antenatal diagnosis of a fetal dural venous thrombosis / W. Carseldine, F. Park, C. Abel [et al.] // Ultrasound Obstet. Gynecol. - 2013. –Vol. 42, No. 1. - P. 151.

5. Esetov, M.A. Echography of the central nervous system of the fetus. Intermediate sail cavity: own observation and literature review / M.A. Esetov, G.M. Bekeladze, E.M. Huseynova // Prenat. Diagn. - 2015. –T. 14, no. 1. - pp. 46–51.

6. Ergashev S., Usmanov R., Niyozov N. Morpho-functional changes in the endocrine pancreas of white rats under metabolic syndrome conditions //Central Asian Journal of Medicine. – 2025. – №. 4. – C. 75-80.

7. Kurbanovich N. N., Abdurasulovich G. D. Features of morphological changes in the pancreas //Texas Journal of Medical Science. – 2023. – T. 16. – C. 79-83.

8. Kurbanovich N. N. et al. Reactive changes in the pancreas in hypothyroidism //American Journal of Interdisciplinary Research and Development. – 2024. – T. 25. – C. 343-347.

9. Kuldasheva m. N. Et al. Morphology of the ventricles of offspring born to mothers with experimental hypodynamia // Central Asian journal of medicine. – 2026. – №. 3. – c. 46-50.

10. Mukhamadovna A. S. et al. Indicators of Fetometry of the Fetus in Pregnant Women in a State of Hypothyroidism //Texas Journal of Medical Science. – 2023. – T. 16. – C. 75-78.

11. Mukhamadovna A. S. et al. Morphological Characteristics of Myocardial Changes When Exposed to Pesticides //Onomazein. – 2023. – №. 62. – C. 1226-1237.

12. Matkarimov O., Axmedova S., Niyozov N. Criteria for assessing structural changes in the myocardium in experimental hypodynamic and diabetes //Central Asian Journal of Medicine. – 2025. – №. 3. – C. 273-283.

13. Matkarimov O., Axmedova S., Niyozov N. Tajribaviy gipodinamiya holatida miokardning morfologiyasi //Modern Science and Research. – 2025. – T. 4. – №. 5. – C. 338-343.

14. Niyozov N.Q. Tajribaviy qalqonsimon bez kasalliklari fonida me’da osti bezi morfologiyasi // Medical journal of young scientists. – 2026. – №. 17 (03). – c. 210-214.

15. Niyozov N., Ergashev S. Pancreatic morphology in thyroid diseases in white mice //Modern Science and Research. – 2025. – T. 4. – №. 4.

16. Niyozov N. K. et al. Morphological Aspects of Pancreas Changes in Experimental Hypothyroidism //Journal of education and scientific medicine. – 2023. – T. 8. – №. 2. – C. 27-31.

17. Niyozov N. K. et al. Morphology of the Pancreas Against the Background of Hypothyroidism //Journal of education and scientific medicine. – 2024. – T. 18. – №. 5. – C. 47-52.

18. Niyozov N., Qo‘qonboyev M. Me’da osti bezi morfologiyasi tajribaviy gipotireozda //Modern Science and Research. – 2025. – T. 4. – №. 3. – C. 798-806.

19. Niyozov N. K., Kukonboyev M. I. Pancreatic gland morphology in experimental hypothyroidism //Modern Science and Research. – 2025. – T. 4. – №. 4. – C. 1169-1176.

20. Niyozov N.Q. Kalamushlar me’da osti bezi morfologiyasi tajribaviy gipotireoz fonida //Modern Science and Research. – 2025. – T. 4. – №. 6. – C. 955-961.

21. Umerov A. A., Niyozov N. Q. Pancreatic pathologies: understanding the interplay between chronic diseases and metabolic dysfunction //Conference on the role and importance of science in the modern world. – 2025. – T. 2. – №. 1. – C. 104-107.

22. Umerov A. A., Niyozov N. Q. Pancreatic morphology in experimental stress //Multidisciplinary Journal of Science and Technology. – 2025. – T. 5. – №. 1. – C. 223-227.

23. Umerov A., Niyozov N. Pancreatic morphometry under stress //International journal of medical sciences. – 2025. – T. 1. – №. 1. – C. 362-368.