

## FEATURES OF ANTHROPOMETRIC INDICATORS OF CHILDREN OF THE FIRST YEAR OF LIFE BORN OF MOTHERS IN THE STATE OF HYPOTHYROIDISM

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**Abstract:** During pregnancy, all organs of the mother work more intensely, since they have to be responsible for the vital activity of not only the mother, but also the child. This also applies to the thyroid gland, which provides hormones to both mother and baby until he has formed his own endocrine system. The vital hormones for both are the thyroid hormones thyroxine (T4) and triiodothyronine (T3). A lack of these hormones, called hypothyroidism, can affect both the course of pregnancy and the health of the expectant mother and her baby. However, with constant medical supervision, pregnancy and natural childbirth with hypothyroidism are quite real. With full control and following all the recommendations of doctors, pregnancy and childbirth with hypothyroidism will go well.

**Relevance of the topic.** Children's health is a complex indicator, the formation of which, according to the World Health Organization, should be considered in unity with the health of the mother and the state of the external environment [WHO, 2007]. One of the leading factors that ensure the physical, mental, intellectual development of the child is adequate provision with microelements, primarily iodine [V.A. Tutelyan, 2009; M. B. Zimmermann, 2009]. Iodine is an integral part of thyroid hormones, which determine the activity of the course of almost all metabolic processes in the body, which are responsible for the formation and development of many functions of the human brain [M. N. Balabolkin, 2007]. In conditions of iodine deficiency in the body, inadequate production of thyroid hormones occurs, leading to iodine deficiency diseases, which primarily affects the intellectual development of the child, a decrease in social adaptation, impaired growth and, as a result, entails a complex of somatic and neurointellectual problems [V.V. ... Fadeev, 2005; A. V. Kiyayev, 2008; I. Taga, 2009; A. A. Baranov, 2011]. Intellectual disorders in a child caused by iodine deficiency in the prenatal and early neonatal period are irreversible [F. Azizi, 2005; R.C. Gordon, 2009; A. Melse-Boonstra, 2010]. Iodine deficiency of mild and moderate degree in children often does not have pronounced clinical manifestations, but in the process of progression of iodine deficiency leads to an increase in the population of persons with partial and borderline disorders of the cognitive sphere [L. A. Shcheplyagina, 2010].

Iodine consumption deficiency of varying severity is observed practically throughout the entire territory of the Russian Federation [G. A. Melnichenko, 2005; E.A. Troshina, 2007; F. M. Abdulhabirova, 2007]. The Kemerovo region belongs to regions with natural iodine deficiency [E. V. Parmenova, 1997; L.A. Suplotova, 2008; E. N. Zatolokina, 2009; L. V. Kvitkova, 2009]. The provision of the population with

iodine is determined not only by the region of residence, but also by the lifestyle, food culture. The iodine requirement of a breastfed baby in the first year of life depends on the mother's health, nutrition, and iodine prophylaxis.

Numerous studies devoted to the study of the health of children in an iodine-endemic region concern mainly children of preschool and school age [I. I. Dedov, 2006; E.A. Troshina, 2007; A. V. Kiyayev, 2008; N. R. Mollaeva, 2008; F. M. Abdulhabirova, 2010]. Violations of the health of children of the first year of life, born to mothers with thyroid pathology, were identified by V.A.Ageikin, R.G. Artamonov (2000), S.V. Krasnova (2002). Low supply of iodine to children of the first year of life in an iodine-endemic region was revealed by L. A. Scheplyagina (2003), O. Ya. Deineko (2003). There is no consensus on the issue of the prophylactic dose of iodine preparations in pregnant women and nursing mothers [V. V. Fadeev, 2003; M. Murcia, M. Rebagliato, 2011; M. Murcia, 2010; M. B. Zimmermann, 2009]. The features of the development of children in the first year of life, depending on the iodine prophylaxis of mothers in the iodine-endemic region, have been little studied, which served as the basis for this work.

**Purpose of the study.** To identify some indicators of anthropometric development of the fetus and their change in dynamics in pregnant women in a state of hypothyroidism using ultrasound screening examination.

**Methodology and research methods.** The studies were carried out on the basis of the 2nd clinic of SamMI, in compliance with all the necessary ethical and deontological standards. The work is based on the analysis of standard fetometric parameters (biparietal size, frontal-occipital size, head circumference, abdominal circumference, femur length - studied on a retrospective analysis of case histories), as well as additional research on the dimensional characteristics of the fetal thymus. Standard fetometry indices allow us to judge the development of the main parts of the fetal body (head, trunk, limbs), indirectly form an idea of the development of the cerebral section of the skull and brain.

To accomplish the tasks set in the work, the analysis of the results of a study of 50 healthy fetuses and 60 fetuses in pregnant women in a state of hypothyroidism was carried out at the stages of screening 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), 30-31 weeks, 32-33 weeks and 34-35 weeks (third screening). At the same time, the selection of pregnant women was strictly observed. The pregnant women had singleton pregnancies in the age group from 20 to 35 years old, weighing from 60 kg to 80 kg.

**Research results and their discussion.** According to the obtained results of significant differences in fetometric parameters in healthy fetuses and fetuses in pregnant women in a state of hypothyroidism at the stages of screening examination of pregnant women, the following indicators were revealed. The main fetometric indicators are presented in Table 1. According to our data for different periods of pregnancy, fetuses from healthy pregnant women increased their body length by 1.5 cm and in pregnant women in a state of hypothyroidism by 0.4 cm. Fetuses in pregnant women in a state of hypothyroidism during studies almost did not change their weight, fruits from healthy pregnant women, increased body weight by 0.8 kg. The biparietal size in pregnant women in a state of hypothyroidism remained unchanged, in fetuses from healthy pregnant women, the spirometry index increased by 0.27.

**Table 1. Fetometric parameters in fetuses of intrauterine development from 12-13 to 24-25 weeks**

Development period, week	Biparietal size, sm	Abdominal circumference, sm	Frontal-occipital size,, sm	Head circumference, sm	Femur length, sm
Fruits from healthy pregnant women					
12-13	124,5±7,61	31,3±2,51	15,5±4,7	1,43±0,15	1,51±0,27

14-15	131,9±3,57	31,8±2,87	9,3±1,38	1,33±0,19	1,66±0,33
20-21	132,8±1,9	33,9±4,2	12,0±1,78	1,68±0,1	1,75±0,29
24-25	138,9±1,89	38,1±5,5	20,7±9,24	1,70±0,12	1,79±0,24
Fetuses in pregnant women in a state of hypothyroidism					
12-13	123,3±2,73	26,6±2,29	13,4±2,84	1,42±0,12	1,52±0,2
14-15	123,7±5,2	26,01±2,29	15,6±3,84	1,4±0,06	1,41±0,14
20-21	124,3±9,2	25,7±1,96	14,0±3,05	1,47±0,12	1,33±0,31
24-25	128,8±0,25	26,7±0,68	20,0±10,0	1,40±1,30	1,21±0,30

Numerical values reflecting the dynamics of anthropometric indicators in fetuses during intrauterine development in the period of 30-35 weeks are presented in Table 2. From the results during the observation process, it follows that this age period is characterized by some slowdown in growth rates. The most intense changes were noted during the last periods of the development of weeks of intrauterine development of the fetus, both in healthy and in pregnant women with hypothyroidism. In general, the binarietal size in fetuses from healthy mothers increased by 1.8 cm (11.2%), in fetuses in hypothyroid women - by 0.86 cm (4.42%). However, fetuses from healthy mothers have higher growth rates compared to the constants of physical development [3], according to which, in fetuses from healthy mothers, growth gains vary from 1.6 cm at 30-31 weeks to 1.7 cm at 34-35 weeks ... In fetuses of pregnant women in a state of hypothyroidism, growth rates do not differ from constants from 0.8 cm at 30-31 weeks to 1.1 cm at 34-35 weeks.

The increase in abdominal circumference and head circumference was 1.9 cm in fetuses from healthy mothers and 1.07 cm in fetuses of pregnant women in hypothyroidism (22.2% and 3.02%, respectively). During fetal development of the last trimester, fetuses are characterized by a gradual increase in the circumference of the abdomen and head. In our case, the increase occurs, but small, especially in fetuses from healthy mothers.

The assessment of the level and harmony of physical development was carried out using indices, the average group values of which are shown in Table 2.

The Quetelet index indicates the ratio of the absolute indicators of fetometric sizes of the fetus used to assess the degree of fatness. The value of this index in fetuses from healthy mothers is within the normal range. Pregnant fetuses in a state of hypothyroidism are underweight, judging by the Quetelet index. With the intrauterine development of the last trimester in fetuses of pregnant women in a state of hypothyroidism, the Quetelet index decreases, which indicates a decrease in the fatness of children with problems of motor activity. The Pigne index allows you to assess the strength of the physique. The average values of the Pignet index in the observed groups tend to decrease, which indicates an increase in the strength of the physique. The average values of the Erisman index in both study groups throughout the entire period of the survey are estimated below average.

**Table 2. Fetometric indicators in fetuses of intrauterine development from 30-31 to 34-35 weeks**

Development period, week	Binarietal size, sm	Abdominal circumference, sm	Frontal-occipital size,, sm	Head circumference, sm	Femur length, sm
Fruits from healthy pregnant women					
30-31	128,5±8,71	38,3±3,57	16,5±4,9	1,64±0,19	1,61±0,37
32-33	139,9±5,67	39,4±3,64	11,3±1,79	1,73±0,33	1,76±0,43
34-35	142,8±3,9	41,6±4,6	14,0±1,98	1,88±0,21	1,85±0,39
Fetuses in pregnant women in a state of hypothyroidism					

30-31		121,3±3,56	27,6±3,19	12,6±3,64	1,32±0,14	1,42±0,17
32-33		126,7±6,3	25,06±2,21	13,4±3,51	1,37±0,06	1,31±0,19
34-35		129,3±9,4	25,2±1,91	14,6±3,31	1,41±0,16	1,33±0,34

**Conclusions.** Thus, the results of anthropometric examination and calculation of indices showed that during the first weeks of intrauterine development in fetuses, fetometric indicators with harmonious physical development decrease.

The especially significant role of thyroid hormones for the processes of growth and differentiation of tissues, primarily of nervous tissue, has determined the need to study the state of health, physical and neuropsychic development of children with neonatal transient hypothyroidism.

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