

# Health Status of Girls Aged 11-13 Years Old Studying at NEFU School-laboratory "Sergelekh" in Yakutsk

Aelita Ammosova<sup>1,\*</sup>, Sargylana Artamonova<sup>1</sup>, Maria Nokhsorova<sup>1</sup>, Aitalina Trolukova<sup>1</sup> and Maria Maslova<sup>1</sup>

<sup>1</sup>North-Eastern Federal University, Medical Institute, 27, Oyunsky St., 677000, Yakutsk, Russia

\*Corresponding author. Email: aelmma@yandex.ru

## ABSTRACT

The results of comprehensive assessment of health condition in 42 girls aged 11–13 years old who studied at NEFU school-laboratory "Sergelekh" were presented. Only half of girls aged 11–13 years old had average harmonious physical development. The remaining girls were characterized by physical abnormalities: low level of physical development, its disharmony, extreme variants of the somatotype, and, therefore, differences in height, weight, mass-growth ratio, and body proportions. The development of secondary gender traits corresponded to average age values. The average age of menarche was  $12.2 \pm 0.6$  years. Health abnormalities in more than half of girls were functional. A quarter of girls had disorders in the emotional-autonomic sphere. It should also be noted a large frequency of functional deviations of the gallbladder, a posture disorder with external manifestations of diseases – such as myopia (wearing glasses), dental caries, scoliosis.

**Keywords:** *health status, health condition, physical abnormalities, school-laboratory, Yakutsk*

## 1. INTRODUCTION

The health protection of the younger generation has been proclaimed a national strategy of the State policy of the Russian Federation due to the decreasing reproductive potential of the population in recent years [1]. The reproductive function state is largely determined by the favorable course of puberty, monitoring of important health criteria: adolescent growth and development [2]. Considerable attention has been paid in recent decades to the characteristics of the puberty period among girls. Researchers note that current trends in the sexual development of girls are a decrease in the overall age range of pubertal, age unevenness of thelarche and menarche, high incidence of disharmonic development and disorders of menstrual function [3–5]. The foundations of physical and sexual development are given in childhood, therefore, the indicators characterizing it are mandatory in assessing the health of the younger generation [6–8]. In the complex chain of causal relations underlying any pathological state and whether pathology, in fact, each link of this chain is either a cause or a condition for the

development of the process, which means that many of the phenomena we know today should be considered as risk factors. Physical development is an integral indicator of health, which is influenced by a variety of external and internal factors. Assessment of physical and sexual development allows identify the earliest signs of diseases such as obesity, nanism, gigantism, hypogonadism, premature sexual development. In recent years, there has been a negative trend among children's health [9, 10].

The purpose of the study is to conduct a comprehensive assessment of the health status of girls aged 11–13 years old studying at NEFU school-laboratory "Sergelekh" in Yakutsk.

## 2. METHODS AND MATERIALS

The study included 42 girls of Yakut nationality aged 11 to 13 years old 8 months, studying at school-laboratory "Sergelekh" in Yakutsk, from the 5th grade – 13 girls, 6th – 16, 7th grade – 13 girls. The study included data on the examination of girls who had informed voluntary consent signed by parents or legal

guardians, in the absence of a negative reaction to the examination.

The examination was carried out in natural conditions, without deviating from the usual regime of the day for the child and organizational and methodological measures of the educational institution. The study used non-invasive techniques. Primary information was collected by copying data from primary medical documentation. To assess the state of health of children, a survey was conducted, a history was clarified and complaints were collected. All children underwent anthropometric measurements with an assessment of physical development.

Ophthalmological examination included: visometry, refractometry (skiascopy), ophthalmoscopy.

The surgeon diagnosed the degree of scoliosis visually, by a special tilted sample. The pathology of the foot was diagnosed by a plantograph, the degree of flatulence was established according to Chizhov's method. The dentist recorded dental status. He examined the oral cavity, palate, dental formula, bite.

The obstetrician-gynecologist evaluated secondary sexual signs, collected a history of menstrual function, and measured the anatomical external dimensions of the pelvic inlet. All data were recorded in the table according to the Tanner scale criteria. The stage of sexual development was determined in age parameters, where the generally recognized norm of 11 years old was within the limits of 1.2 to 2.7 points, the lag – with below 1.2 points, the advanced – more than 2.7 points. At 12 years old, the norm was from 1.2 to 7.0, the lag was below 1.2 points, the advanced was more than 7 points. At 13, the norm was within 3–11.6 points, the lag was below 3.0 points, and the advanced was more than 11 points. At 14, the norm was 5–12 points, the lag was below 5 points. Pelviometry was carried out with obstetric metal pelvimeter along the external bone landmarks: distantia spinarum – the distance between the anterior upper bones of the iliac bones; distantia cristarum – the distance between the most distant points of the ridges of the iliac bones; distantia trochanterica – the largest distance between the large trochanters of the femurs; c. externa – the distance between the middle of the upper outer edge of the symphysis and the articulation of the V lumbar and I sacral vertebrae. The girls were examined by a pediatrician with measurement of the main functional indicators: heart rate (HR), respiratory rate (HRD), blood pressure (BP). The health group was established on the basis of the order of the Ministry of Health of the Russian Federation of 30.12.2003 No. 621 "About comprehensive assessment of the health state of children." Statistical data processing was carried out on the basis of Microsoft Excel 2016.

### 3. RESULTS AND DISCUSSION

**Table 1.** The main indicators of physical development in the examined girls

Indicator	Girls aged of 11–13 years old (n=42)	
	Absolute	%
The level of physical development		
Low, below average	14	33.3
Average	20	47.6
High, above average	8	19.1
Harmonious physical development		
Harmonious development	17	40.5
Disharmonious development	21	50
Sharply disharmonic	04	9.5
Somatotype		
Microsomatic	18	42.9
Mesosomatic	13	30.9
Macrosomatic	11	26.2

When questioned, 19.1 % of girls complained of headaches, fatigue, 14.3 % – abdominal pain, constipation, reduced appetite, 7.1 % – back pain, joints.

According to the centile method, 47.6 % of girls were estimated to have a physical development level of 27 to 75 centiles, which corresponded to average values. In 33.3 % of girls, physical development was below average, low and 19.1 % of high and above average. In 26.2 % – a deficiency of body weight of the I<sup>st</sup> degree was determined, in 14.3 % – a deficiency of body weight of the II<sup>d</sup> degree. One (2.3 %) schoolgirl revealed excess body weight of I degree.

The assessment of physical development showed that 40.5 % of girls had height, weight and breast circumference in one centile corridor or in neighboring ones, which indicated the harmonious development of schoolgirls. The difference in height and weight was 2 centile corridors in 50 % of girls, which made it possible to determine their disharmonic physical development, in 9.5 % – sharply disharmonic (3 centile corridors or more).

When assessing neuropsychiatric development, most girls did not have deviations. 23.8 % of schoolgirls revealed emotional-autonomic sphere disorders in the form of small irritability, hidden anxiety. Two (4.8 %) girls had untested manifestations from the psychomotor sphere (increased blinking, history of logoneurosis). All girls successfully learn school curricula.

**Table 2.** Abnormalities in neuropsychiatric development in surveyed girls

Dominant deviation in neuropsychiatric development	Girls aged of 11–13 years old (n=42)	
	Abs.	%
In the emotional-vegetative sphere	10	23.8
In the psychomotor sphere and behavior	2	4.8
In Intellectual Development	0	0
Total	12	28.6

We would consider the functional deviations we found in the girls we examined. As you see from the data presented in Table 3, the most common functional abnormalities in girls were bile dyskinesia, posture disorders, vegetative dystonia syndrome (VDS) syndromes of mild degree. Severe VDS, reduced resistance to infections, eye refraction disorders were less common. One child had a small abnormality in heart development.

**Table 3.** Incidence of functional abnormalities in the examined girls

Functional deviations	Girls aged of 11-13 years old (n=42)	
	Abs.	%
Moderate to severe vegetative dystonia syndrome	3	7.1
Mild autonomic dystonia syndrome	7	16.7
Often sick children (children with reduced resistance)	3	7.1
Vasomotor rhinitis	1	2.4
Bile bladder dyskinesia	19	45.2
Posture violation	9	21.4
Cardiovascular Development Abnormalities (chorda)	1	2.4
Shortsightedness	12	28.6
Other eye refraction disorders	6	14.3

The gynecologist examination revealed that 61.9% adolescents had menarche at the time of examination, the average age of menarche was –  $12.2 \pm 0.6$  years, which corresponds to the average indicators for the Russian Federation. When assessing sexual development according to the Tanner formula, stage 0 was detected in 2.4 % of girls, stage I in 2.4 %, Ia in 35.7 %, Ib in 19.0 %, stage II in 19.0 %, III in 16.7 %, IV in 4.8 % (Table 4). One girl showed a menstrual disorder by type of moderate dysmenorrhea.

**Table 4.** Analysis of indicators of development of secondary gender traits according to the Tanner method in surveyed girls

Signs	Girls aged of 11–13 years old (n=42)	
	Abs.	%
<i>Degree of menstrual function development</i>		
Me 0 (absence)	16	38.1
Me 1 (menarche)	26	61.9
<i>Stages of Breast Development</i>		
Ma 0 (not increased)	3	7.1
Ma 1 (swelling of areola)	10	23.8
Ma 2 (underdeveloped breast)	11	26.2
Ma 3 (ephebic breast)	13	30.95
Ma 4 (mature breast)	5	11.9
<i>Degree of pubarche</i>		
P 0 (no hair)	21	50
P 1 (single straight hair)	5	11.9
P 2 (thick long hair)	9	21.4
P 3 (thick curly hair)	8	19.05
<i>Degree of axillary hair</i>		
Ax 0 (no hair)	30	71.4
Ax 1 (single straight hair)	10	23.8
Ax 2 (thick long hair)	2	4.8
Ax 3 (thick curly hair)	–	–

External pelviometry showed that the size of the pelvic inlet in most girls corresponded to the optimal values of the age group. In 19.4 % of girls, a decrease in the transverse size of the pelvis was noted, but this fact was not critical due to the incomplete development of the obstetric pelvis at the time of this study.

The oculist found that 28.6 % of girls had a decrease in visual acuity (myopia). Myopia of the 1st degree was more common, in the 1st teenager – the 2nd degree.

A dentist made a visual assessment of dental status. It was found that only 14.3 % of children did not show the pathology of the dental system. In 16.7 % of schoolgirls, the oral cavity was sanitized. 73.8 % of girls showed single caries, in 3 – caries of teeth was multiple. 19.5 % of girls had bite disorders: straight – in 4, deep – in 2, reverse – in 1, open – in the 1st child. One schoolgirl had an ectopia of teeth.

A surgeon identified postoperative adhesive pain of a chronic nature in one child, scoliosis of the thoracic spine of various degrees – in 21.4 % of girls. According to the plantogram, flatulence was determined in 23.8 % of adolescents.

According to a comprehensive examination of girls, it was found that the I-th health group was only one student (no deviations in health), the II-d (functional

deviations) – in 69.0 % of schoolgirls, the III (chronic diseases) – in 28.6 % of girls.

#### 4. CONCLUSIONS

Thus, the general data showed that only half of girls aged 11–13 years old from the school-laboratory "Sargelekh" had an average harmonious physical development. The remaining adolescents showed the following physical deviations: low level of physical development, its disharmony, extreme variants of the somatotype, and therefore differences in height, weight, mass-growth ratio, body proportions. The development of secondary gender traits corresponded to average indicators of age values, which coincides with the general data for the Russian Federation. The average age of menarche was  $12.2 \pm 0.6$  years, which did not contradict the general trends in Russia. This is also evidenced by indicators of the size and shape of the pelvis. During the period of bone pelvis development in girls in the transitional adolescent period, the pelvis could have a transverse shape, which in the future, with a sufficient hormonal estrogen background, should form into the bone pelvis with normal parameters. One schoolgirl showed a menstrual function disorder, which occurred according to the type of dysmenorrhea of moderate severity, which required consultation with a pediatric gynecologist with a subsequent in-depth examination of the reproductive system. In addition, this teenager is subject to a routine examination by endocrinologist to exclude the pathology of the endocrine system and other specialists for medical causes.

According to this comprehensive development, the health status of more than half of girls was functional. A quarter of girls had disorders in the emotional vegetative sphere, which was most likely due to both the pubertal period, school loads, and individual features of somatic health. In addition, it should be noted a large frequency of functional deviations on the side of the gallbladder, posture disorders with external manifestations of diseases – such as myopia (wearing glasses), dental caries, scoliosis. It should be taken into account that the detected functional deviations and changes in organs and systems without timely correction in adolescence, can lead to a chronization of processes, a heavier degree of functional disorders, causing systemic changes, thereby worsening the adaptation of the girl body to the transition period and slowing down the development of a mature organism. The characteristics of the pubertal period in schoolgirls can also influence the development of the reproductive system and generally affect the realization of reproductive potential in the future.

According to the results of the study, all schoolgirls with detected health disorders were allocated to a separate group with a risk of school maladaptation and

sent for further examination to narrow specialists at the place of residence.

#### REFERENCES

- [1] S.E. Dovbysh, A.D. Davydova, A.K. Tormosova, Education and Humanities Research 316 (2019).
- [2] R.I. Ajzman, Novosibirsk State Pedagog. Univ. Bull. 2 (2012) 3.
- [3] R. Pourkazemi, M. Janighorban, Z. Boroumandfar, F. Mostafavi, Reprod. Health 17 (2020) 13.
- [4] T.E. Burtseva, T.E. Uvarova, M.I. Tomsy, J. Odland, Int. J. of Circump. Health 73 (2014) 1.
- [5] I.L. Nikitina, Arter. Hypertens. 19 (2013) 3.
- [6] O. Yurchuk-Zuliar, O. Tulyakova, A. Kunshin, Pedagogics, psychology, Med. I-biol. Probl. of phys. training and sports 22 (2018) 1.
- [7] M.M. Fisher, E.A. Eugster, What is in our environment that effects puberty? Reprod. Toxicol. 44 (2014).
- [8] J.A. Graber, J. Brooks-Gunn, in: G.M. Wingood, R.J. DiClemente (Eds.), Handbook of Women's Sexual and Reproductive Health, Issues in Women's Health, 2002.
- [9] A.A. Baranov, L.S. Namazova-Baranova, R.N. Terletskaia, E.V. Antonova, Ann. of the Rus. Acad. of med. Sci. 72 (2017) 4.
- [10] O.V. Proskurina, E.Y. Markova, V.V. Brzhetskij et al., The Ophthalmol. in Rus. 15 (2018) 3.