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N.R.Rogova, N.M.Myrsahanov

E.A.Buketov Karaganda State University

**ESTIMATION OF THE PICTURE OF CHILDREN HEALTH  
OF THE YOUNGER CLASSES ON BASE OF THE PHYSIOLOGICAL FACTORS**

*Мақалада денсаулық — зор байлық екендігі, оның ішінде балалардың денсаулығын сақтау құндылықтары, оның дамуы мен өсу кезіндегі өзгерістері, оқушылардың денсаулығын жүйелі, медицина-биологиялық бақылау, әсіресе денсаулықтың сапалық және сандық көрсеткіштеріне назар аудару қажеттілігі туралы баяндалған.*

*В данной статье рассматриваются вопросы сохранения здоровья, в частности, у детей, изменения показателей здоровья учащихся в процессе развития. Формируется вывод о необходимости медико-биологического мониторинга здоровья.*

Health is the main wealth of each person. Particularly, greater value presents health of children. It changes in process of the growing and developments. That is why it needs for regularly physician-biological checking for picture of the school children health. The processes of the growing and developments are the common biological characteristic to alive matter. Under development in broad sense of the word follows to understand process quantitative and qualities of the change of the human organisms (Rosinskyi L.X. 1978). Development comprises of itself three basic factors: growing up, changeable of the organism, making forms.

They are found between itself in close-fitting intercoupling. One of the basic of the physiological particularities of the process of the development, which makes child organism distinguish than adult organism, it is quantitative process. It makes masses of organism more and changes hatches size and their number.

Number of the hatches increase in process of the growing, flesh-colored mass. In one organs, i.e. bone, growing is realized to account of enlarge sizes hatches themselves, in others (muscles, nervous fabrics) dominate processes of enlarge sizes hatches themselves. Such determination of the process of the growing excludes that change the mass and sizes of the body, which can be conditioned with fat and delay of water. More exact factor of the growing of the organism, it is increasing in him gross amount squirrel and enlarge sizes of the bones. (Hripkova A.G., 1987, Antropova M.V., 1990). In process of ontogenesis separate organs and systems ripen gradually and terminate its development at different periods of the lives. This process ripening makes particularities of the operating the organism of children miscellaneous of the age. Appears need of the separation determined stage or period of the development. At present wide-spread age of periods: new burn, kid garden, preschool and school ages. School age in turn subdevides on younger, average and school ages. (Antropova V.V., 1965).

Symposium on problem age periods in Moscow, recommended scheme age periods, which has a significant spreading. On this scheme in life cycle of the person before achievement of the mature age select following periods:

1. New burn — 1–10 days;
2. Breast age — 10 days — 1 year;
3. Infancy — 1–3 years;
4. First childhood — 4–7 years;
5. Second childhood — 8–12 years for boys, 12–15 years for girls;
6. Teenagers age — 13–16 years for boys, 12–15 years for girls;
7. Juvenile age — 17–21 years for boys, 16–20 years for girls.

Criterion such periods comprised complex sign of itself: size of body and organs, masses, skeleton's change, teething, degree sexual maturations, development ductless gland, muscular power.

Each age period is characterized their own specific particularity. Transition from one age period to the following mark as critical stage of the individual development or critical period. (Antropova M.V., Kolcova M.M.).

The typical particularity of the process of the growing of the baby organism are his even less and wave. Periods of the escalated growing are replaced his some decelerations.

Most intensity growing child differs in first at first year of the life's and at period sexual maturations, in 11–15 years. If birth growing child at the average is 50 centimeters, by the end of first year of the life's he reaches 75–80 centimeters, that means in increases more then on 50 %. Mass of the body for year is forfeited — at birth child it is at the average 3,0–3,2 kg., at the end of the year 9,5–10,0 kg. At following years before period sexual maturations rate of growth falls and annual gain of the mass forms 1,5–2,0 kgs., with growing lengths of the body on 4,0–5,0 centimeters. Second jump of the growing is connected with approach sexual maturations. For year length bodies increases on 7–8 and even on 10 centimeters. Moreover with 11–12 years girls several overtake in growing boys in connection with more early beginning sexual maturations. In 13–14 years girls and boys growing up together. In 14–15 years boys outstrip in growing girl and this excess of the growing beside mans on woman is saved in current of the whole life's. (Leontiev N.N., Varinova N.V.). On row from enlarge masses and sizes of the body, occur qualitative changes to system of the organism. In young school age nervous processes already possess significant power and even temper, conditioned reflexes by sufficient stability.

In the young school age of the significant development reach the speech function and touch systems. The interaction increases the ability to full and deep verbal expression to their own motor sensation. The first and second signal systems are improved. Verbal information becomes more concrete and more full. Increase temporary relationship between word. Increases the ability to more full and deep verbal expression to their own motor sensation. Physical education and atheletic improvement increase the influence a speech thinking on motor function. (Seropegin I.M., Volkov V.M., Sinaiskyi M.M., 1979).

Thereby, shaping to functions of the cortex greater hemisphere, being the basis of behaviors teenager, is terminated to 10–12 years. Here to time is practically terminated development of the circulatory system of the children. By the Arshafskyi I.A. words, beside children of the younger school age (6–11 years) amount shelters forms 7 % from mass of the body. The heart beside of children comparatively more than beside adult. Its mass forms approximately 0,63–0,8 % masses of the body, but beside adult 0,48–0,52 %. To 6 years mass heart increases in 4 times, but to 8 years already in 6 once. (Ermolaev Y.A., 1985). The mass heart beside boy at the first years of the life's more than beside girls. The period of the escalated growing heart approaches In 12–13 years beside girls and its mass becomes more than beside boys. To 16 years girl's heart newly begins to lag behind from heart boy in masse. (Galperin S.I., 1984).

The velocity of the circulation shelters since age is slowed that is connected with enlarge lengths container. Beside children of the younger school age blood makes full circulation, occurs big and small circles of blood in 16 seconds. Beside adult person for 1 minute in 4 times slowly approximately. The growing and development of the circulatory system are closely connected with similar process of the respiratory system. Already at age 7–8 years are revealed sexual of the difference in type of the breathing: dominating abdominal type of the breathing becomes beside boys, beside breast. Ends of the sexual breathings changing at 14–17 years. Beside children since age occurs less breathings before 18–20 entries at minute. Since age of the functions of the respiratory centre are improved and to 10–12 completely formed. (Gal'perin S.I., 1984).

To 11 years already well denominated possibility of the adjustment of the breathing to different condition of the life.

Sensitivity of the respiratory centre to contents of the carbon dioxide increases since age and at school age reaches approximately level adult. On measure of the maturation of the cortex greater hemisphere is improved possibility arbitrarily to change the breathing: suppress respiratory motion or produce the maximum ventilation light. (Antropova M.V., 1983).

The child's organism, in change from adult, quicker reaches the maximum level of the consumption of the oxygen and quickly stops work because of inability long to support the consumption of the oxygen on high level.

Thereby, growing and development nervous, circulatory and respiratory systems of the organism child is basically terminated to 10–12 years. Though full shaping of these systems parameter adult person occurs at age 18–20 years.

Though regularities of the growing and developments nervous, circulatory, respiratory and the other systems of the organism of child in process ontogenesis studied it is enough packed physiologist, physician, psychologist, health at period of the education in school not only is not saved and is not consolidated, but on the contrary grows worse. So as of Ananieva N.I., school finish sound only 14 % graduate, but rest have that or other deflections of able health. Basic reasons of such position are an all the manner of breaches of the hygienic rates microclimate in school premieres, conditions of the education and feeding school children.

The multiple hygienists are designed standards of the education, mode mental and physical activity schoolboy depending on age and mode of the feeding. (Andropova M.V., 1991,1979, 1986). However studies scientist are not used in majority of the schools in practice, since teacher in connection with absence subject «age physiology and school hygiene» in curriculums under their education in HIGH SCHOOL not introduce, make familiar with scientifically-motivated condition of the conservation and fortifications of health school children. In this connection in Russian Academy of the formation in 1996 is formed scientific centre «School and health», in composition which enter the teachers -a methodists, physicians, physiologists, hygienists, specialists physical education. The purpose of this scientific centre — a study of the influence of the factor inwardly school ambience on health, mental capacity to work, physical development, motor preparation school children and preparation recommendation leader organ formation, teacher, parents and children.

#### *Material and methods of the studies*

Our studies were conducted in secondary school 14 on pupil 2, 3, 4 classes. The whole was examined 120 pupils. All schoolchildren were portioned on 6 groups: 1 group — boys 2 classes (20 persons), average age (8 years), 2 groups — 2 classes girls (20 persons), average age (8 years), 3 groups — boys 3 classes (20 persons), average age (9 years), 4 groups — girls 3 classes (20 persons), average age (8 years), 5 groups - boys 4 classes (20 persons), average age (10 years), 6 groups — girls 4 classes (20 persons), average age (10 years).

School children were organized before beginning of the studies on the following questionnaire:

#### **Questionnaire of the pupil** Full name

1. Date of birth.
2. Growing.
3. Weight
4. How much days has missed on disease last year?
5. Select disease, which:
  - a) most often are ill (~),
  - b) are ill, but less (-),
  - c) sometimes are ill (—),
  1. disease organ breathings,
  2. disease organ digestions,
  3. traumas, poisoning,
  4. infectious diseases,
  5. allergic diseases,
  6. the disease of the nervous system and organ feeling.
6. Do you have a mode of the day?
7. Do you keep mode of the day:
  - a) Yes,
  - b) Not always,
  - c) Seldom,
  - d) No, I don't.
8. How many times at week do the mutational athletics?
9. How much minutes to last the mutational athletics?
10. How much hours spend each day on performing the home task?
11. How much hours in day sleep?
12. What sports rage?
13. Do you like lessons of the physical culture?
14. How much hours daily walk on street after school?
15. Do you concern your organism with cold water:
  - a) Yes.

- b) No  
 16. What kind of body exercises you do?  
 17. Are you tired after school?  
 a) Yes.  
 b) No.  
 18. To what lesson before you tired?  
 19. How much in table for previous year:  
 a) 3,  
 b) 4,  
 c) 5.  
 20. Were you free from lesson of the physical culture and on what reason?

In questionnaire was kept 20 questions on different aspect of health pupils. Material of the questionnaires statistical is processed by V.S.ASATIANI, 1965. On each factor was calculated average arithmetical ( $M$ ), on each group as follows: formed the individual factors on each pupil and were divided on amount pupils in group accurate to 0,08. Values of the square deflections were calculated on base  $M$  for each group on formula:

$$\sigma = \pm \sqrt{\frac{ea^2}{n-1}}$$

-  $a^2$  amount square deflections each measured values from fair arithmetical,  
 $n$  — a number pupil in group.

From importance  $\sigma$  and  $n$  calculated the average mistake  $m$ :

$$m = \pm \frac{\sigma}{\sqrt{n}}$$

From importance  $M$  and  $m$  defined factor of the all the difference in the world ( $t$ ) that is to say number, show in how many times difference between arithmetical value more importance of the square root from amount square average mistake.

$$t = \frac{M_1 - M_2}{\sqrt{m_1^2 - m_2^2}}$$

On the grounds of factors of the all the difference in the world  $t$  and amount pupil in compared group on table V.S.ASATIANI, 1965. Defined validity a difference — using factor  $n$  — an amount pupil in group.

Between some factor we calculated the factor to correlations that is to say installed the nature to dependencies. For calculation of the factor to correlations found the maximum amount, which is importance root square from making the amounts square deflections:

$$\varepsilon M = \sqrt{\varepsilon M_1^2} - \sqrt{\varepsilon M_2^2}$$

$\Sigma M$  — this is a maximum amount square deflections first comparing factor,

$$\sqrt{M_1^2}$$

— this amount square detours from average value second comparing factor.

Multiply importance of the deflections for each pupil find amount of the making the deflections ( $\Sigma n$ ).

Factor of correlations  $\mathcal{U}$  is an amount of the making the deflections on each pupil, determined on maximum amount of the deflection.

$$\mathcal{U} = \frac{\varepsilon n}{\varepsilon M}$$

Negative importance points to feedback of the factors, but positive importance on feed forward. Than closer to 1 importance that presence relationship between factors.

*The results of the studies*

As it is shown in table N 1 index of health in all group turned out to be rather low, more than 50 % pupil during school year addressed to physician in connection with disease.

At the average in explored us group younger pupil for 1 was missed from 1 before 3 weeks scholastic occupation pupils. So, in 1 group is at the average missed on 13–5 days, in 2 groups 10,55, in 3 groups 7,53, in 4 groups 7,87, in 5 groups 13,36, in 6 groups 20,77 days. The big amount scholastic occupation, missed pupil points to absence regular doze loads organism.

Keep the mode of the day from 30 before 50 % younger pupil: in 1 group — 30 %, in 2 groups — 40 %, in 3 groups — 35 %, in 4 groups — 50 %, in 5 groups — 40 %, in 6 groups — 50 %, but consolidate the organism from 30 before 50 %. As it is shown in table length appear in the dreams in all group pupil turned out to be limit of the physiological rate.

The children much little time conduct on become cool the air, so as of Hripkova, pupils 1 and 2 groups must conduct outside not less 2 hours, 3–4 groups — 2,5 hours, 5–6 groups — 3 hours. But practically conduct far less. So amongst children 2 classes only boys conduct on become outside it is enough time, girls only approximately 75 % from need. Else less conduct on become outside of time schoolchildren senior age. In this connection will grow old on occupation already to the third lesson more halves pupil, since low physical capacity to work with low mental capacity to work. On result us is installed that in miscellaneous group from 1/3 before 50 % children do physical charging moreover absolute majority not regularly. So, in 1 group do physical charging 3–4 times at week, 1–2 groups — 3 times at week. Follows to emphasize that length of the physical charging in the same way vastly below recommended (Hripkova and others 1990T.). At length physical charging for this age 15–20 minutes, the boys 1 group spend on physical charging 10,2 minutes, 3 groups — 8,5 minutes, but 5 groups -14,3 minutes. Approximately, as much as time spend on physical charging girls too. Naturally that such length physical charging does not tell on quick pupil in process occupation. Approximately, the half all children will grow old on lesson to 4 usually or 5 lessons: in 1 group -45 %, in 2 groups — 55 %, in 4–5 groups — 50 %, in 3–6 groups — 45 %. Not review on low physical and mental capacity to work younger children, progress in all group relatively high. On our opinion this is explained by diligence younger pupil and not yet lost by desire to learn and liberal attitude of the teachers to pupils.

Table 1

**Some factors of the mode of the day younger pupils secondary school N14 city Abay (2008)**

Factors	Unit of the measurement	Groups						
		1	2	3	4	5	6	7
			1 boys	2 girls	3 boys	4 girls	5 boys	6 girls
Index of health	%	45	50	50	50	40	50	
Missed days on disease	Days/ Pupils	13,45 1,48	10,55 2,03	7,53 1,54	7,87 2,01	13,36 1,83	20,77 2,08	
Keep mode of the day	%	30	40	35	50	40	50	
Toughen his organism	%	30	40	35	50	40	35	
Length appear in the dreams	Hour	9,82 0,84	10,15 1,03	9,85 1,37	9,63 1,13	9,88 0,84	9,73 1,24	
Time spent on performing the	Hour	1,80 0,37	1,80 0,41	1,70 1,02	1,60 1,08	1,90 0,44	1,60 1,32	
Time conducted on street	Hour	2,00 1,08	1,43 2,83	2,17 2,03	1,50 0,88	1,35 2,03	1,63 2,81	

1		2	3	4	5	6	7
Will grow old on occupation in school Whole	%	45	55	45	50	50	45
to 4 lessons		20	20	15	25	40	10
to 5 lessons		25	35	30	25	10	35
Do physical charging	% in once In week minutes	50 3,40 10,20	45 \ 3,10 15,00	35 4,70 8,50	40 4,10 8,20	40 3,90 14,20	45 3,70 8,80
Dispensed from lesson of the	%	10	5	10	10	15	5
Average estimation to progresses	points	4,38 0,92	4,39 0,23	4,27 0,52	4,33 0,63	4,16 0,84	4,40 0,83

### Results

The getting results allow to make the following conclusion:

1. The index of the schoolchildren health of the infant age of the primary school number 14 is in the level from 40 up to 50 %. During the academic year the schoolchildren at average miss from 7,53 up to 20,77 studying hours because of the illness.

2. The regular physical training the infants don't do from 35 till 50 % in different groups do physical exercise 3–4 times a week. At it the lasting of the physical exercise is lower than it is recommended –from 8,5 till 15 minutes.

3. Nevertheless on the lower indexes of the health in all groups is higher-middle point of GPA: from 4,16 till 4,40. It is deals with not enough objective evaluation of the knowledge of the pupils by the teachers.

That's why, the main attention we can stress to the conditions, which provide the keeping and strengthening of the schoolchildren health:

1. The keeping by the teachers scientific norms of mental and physical activities of the schoolchildren.

2. The keeping the hygiene standards of the microclimat of the auditoriums.

3. Rational and full eating of the schoolchildren.

4. the keeping the regime of the day, regular physical training and strengthening procedures under the control of the teachers and doctors.

5. To enter the every day sporting hour into the time-table of the schoolchildren from 1 till 11 classes.

6. To enter into the process of studying the subject «The elder physiology and the schoolchildren hygiene».

7. The systematically keeping nature presentations, which can help to make the ecological situation more healthier in the Karaganda region, in Kazakstan.

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В.Л.Тулেকбаева, Г.П.Погосян

Карагандинский государственный университет им. Е.А.Букетова

## ЛИШАЙНИКИ КАК БИОИНДИКАТОРЫ ЗАГРЯЗНЕНИЯ АТМОСФЕРНОГО ВОЗДУХА

*Мақалада қыналар атмосфера құрамындағы ластанушы заттардың негізгі индикаторы ретінде қарастырылған. Олардың фотосинтез және адам тыныс алуына әсері сипатталған.*

*In this article possibility of research of lichens as a biological indicator of atmospheric air's contamination is considered. Contamination's effect to photosynthesis and respiration of lichens is described. Meeting of different species depend on type of contamination.*

Проблема загрязнения окружающей среды является одной из глобальных проблем современной цивилизации. В связи с развитием промышленности и транспорта в биосферу поступает большое количество вредных выбросов. На Земле практически нет места, куда бы не поступали в той или иной концентрации загрязняющие вещества. Среди них большой удельный вес имеют сернистый газ, оксид углерода, сероводород, аммиак, а также копоть, пепел, твердые частицы. При изучении степени загрязнения окружающей среды промышленными объектами важна реакция биологических объектов на поллютанты. Уникальные свойства лишайников позволили использовать их для общей оценки степени загрязненности атмосферы. На основе этого стало развиваться особое направление индикационной экологии — лишеноиндикация [1].

Лишайники выбраны объектом глобального биологического мониторинга, поскольку они распространены по всему Земному шару и поскольку их реакция на внешнее воздействие очень сильна, а собственная изменчивость незначительна по сравнению с другими организмами. Лишайники чутко реагируют на характер и состав субстрата, на котором они растут, на микроклиматические условия и состав воздуха. В силу чрезвычайного «долголетия» лишайников их можно использовать для датировки возраста различных предметов на основе измерения их слоевищ — в диапазоне от нескольких десятилетий до нескольких тысячелетий.

Чувствительность лишайников к загрязнению воздуха определяется:

- симбиотической природой;
- большой абсорбционной поверхностью (все вещества, включая газообразные и растворенные в воде поллютанты, поглощаются всей поверхностью таллома);
- высокой гидрофильностью;
- средой обитания (осадки, стекающие по стволу, содержат значительно более высокие концентрации поллютантов, чем осадки на открытых местах);
- длительностью жизни.