

DETECTION OF SOME HEMOPATHICAL HYPOMICROELEMENTHOSES
FREQUENCY AND EVALUATION OF THE TRACE ELEMENTS STATUS IN
ADOLESCENTS RESIDING IN AN INDUSTRIAL CITY CONDITIONS

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Introduction. Trace elements play an important role in the normal functioning of all living organisms and their excess or deficiency in the body causes pathological states, united by a general notion- microelementoses [1]. Health of the teenagers, residing in the industrial city conditions and being one of the risk groups as for development in them such pathological states may be preserved both due to the compliance with allowable environmental parameters and maintenance of their body homeostasis that has not been yet the subject of compulsory clinical analysis and interpretation of results obtained in the examination of biomedical researches. Wide spread latent bodily disorders in teenagers due to the increasing environmental load caused by environmental change, especially in industrial cities, has become an urgent ecological and hygienic problem [2]. Therefore, biomonitoring conduct of the adolescents living in the industrial city is a major problem of the modern environmental medicine.

Objective of the research. Identify hypomicroelementoses distribution ratio caused by deficiency of such essential hematopoietic trace elements as iron, copper and zinc, among adolescents permanently residing in the industrial city conditions and evaluate trace element organism status of these adolescents.

Materials and Methods of research. Examined to detect the certain hypomicroelementoses ratio and evaluate trace element status of two groups of adolescent of the both sex permanently residing in the industrial cities of Tashkent

and Chirchik. To identify hypomicroelementoses ratio caused by the deficiency of such essential hemopoietic trace elements as iron, copper and zinc have been examined 102 adolescents by randomly sampling without replacement selection: of them boys - 48 at the age from 14 to 17 years (median age is 15.5 years) and 54 girls between the ages from 14 up to 17 years (median age is 15.5 years) permanently residing in the conditions of the industrial Tashkent city. To identify hypomicroelementoses ratio among adolescents permanently residing in the Chirchik city (area of localization of the Uzbek plant of high-temperature and refractory metals) by random of them 51 boys and 61 have been examined (average age of the examinees was 15.5 years). Blood serum as a biomaterial of the examined adolescents has been studied. Has been analyzed the content of essential hematopoietic micronutrients, namely- iron by batofenantrolin method using kits Bio-La-Test "Iron" production of "LaChema" (Czech Republic); copper by colorimetric methods using kits batokuprein using Bio-La-Test "Copper" produced by "LaChema" (Czech Republic), and zinc by colorimetric method using dithizone [3]. Verification of hypomicroelementoses has been performed on the basis of evaluation of the trace elements content determined in the blood serum by one-third below the lower limit of the referent interval for these micronutrients.

Findings and Discussion. Table 1 shows the frequency microelementoses caused by the deficiency of essential trace hematopoietic elements identified on the basis of determining the concentration of these trace elements in the blood serum below the lower limit of the reference interval specific for each trace element in adolescent of the both sex residing in the industrial city of Tashkent as an example. Table 1. Frequency of hypomicroelemethoses in the examined adolescents living in Tashkent.

Examined children	Ratio of Fe deficiency	Ratio of Cu deficiency	Ration of Zn deficiency
All examined (n - 102)	37.3%	29.4%	33.3%
Boys (n -48)	35.4%	18.8%	29.2%
Girls (n -54)	40.7%	27.8%	35.2%

As can be seen from the above Table, the overall frequency of iron deficiency in the examined group of adolescents was 37.3%, and as a percentage of the overall incidence of iron deficient hypomicroelementoses prevails over the other hypomicroelementoses of the examined adolescents residing in Tashkent. As you can see the frequency of copper deficient hypomicroelementoses being revealed at the reduction in serum copper level in the comparison with the norm is 29.4% among the whole examined group of adolescents; and the frequency of the zinc deficient hypomicroelementoses is 33.3% among the whole group of the examined adolescents. Among the examined girls, the frequency of iron deficient hypomicroelementoses is higher and makes up 40.7%, while in the examined boys this value is 35.4%, i.e. by 5.3% higher, at about the same number of the examined adolescents. Frequency copper-deficient hypomicroelementoses in the examined boys is lower than the frequency of the similar hypomicroelementoses among the examined girls is 18.8% and 27.8% respectively, i.e. by 9.0% lower and the frequency the zink-deficient hypomicroelementoses among the examined boys is 29.2%, while in the examined girls is 35.2%, i.e. by 6.0% lower than that in the adolescent girls. Table 2 shows indicators of the microelement status determined by us in a relatively healthy boys and girls and in children with identified deficiency states of these microelements in the body.

Table 2. Micronutrient indicators in a relatively healthy children and in children with micronutrient deficiency.

Examined children	Iron micromole/l	Copper micromole/l	Zink micromole/l
Healthy boys	14.9 ± 0.34	13.2 ± 0.32	15.4 ± 0.42
Boys with microelements deficiency	9.87 ± 0.28	8.15 ± 0.27	10.0 ± 0.53
Healthy girls	13.5 ± 0.42	12.1 ± 0.34	13.9 ± 0.34
Girls with microelements	7.24 ± 0.38	6.03 ± 0.27	8.13 ± 0.50

deficiency p	< 0.001	< 0.001	< 0.001
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p-reliability between the compared indices in relatively healthy adolescents and adolescents with micronutrient deficiency. As can be seen from the table, between the indicators of trace-element status in the examined adolescents, there are certain differences, so indicators of trace elements in adolescents with microelementoses are statistically validly reduced as compared to conventionally healthy adolescents. In examined adolescents with identified hypomicroelementoses some correlations between the rates of trace elements have been preserved, so iron content prevails over the level of copper and zinc, but the zinc content prevails over the level of iron. Table 3 shows the detected hypomicroelementoses frequency caused by deficiency of the studied essential trace elements, both among all sub-populations of the examined patients, and separately among examined boys and girls.

Table 3. Hypomicroelementoses frequency in adolescents permanently residing in the industrial city of Chirchik.

Examined	Deficiency ratio Fe	Deficiency ratio Cu	Deficiency ratio Zn
All examined (n-112)	43.8%	32.1%	33.9%
Boys (n-51)	41.2%	29.4%	31.4%
Girls (n-61)	54.0%	49.2%	49.2%

As can be seen from the table among all sub-populations of the examined adolescents permanently residing in the city of Chirchik also prevails iron-deficient hypomicroelementose; it comprises 43.8%, copper-deficient hypomicroelementose has been found in 32.1%; and zinc-deficient hypomicroelementose has been detected among examined adolescents in 33.9%. Among the examined boys permanently residing in Chirchik frequency of iron deficient hypomicroelementose makes up 41.2%, and in the examined girls the frequency of iron deficient hypomicroelementose is higher and makes up 54.0%.

In examined boys, frequency of the copper deficient hypomicroelementose has been detected in 29.4%, while in the examined girls copper deficient hypomicroelementose comprises 49.2%. In the examined boys frequency of the zinc deficient hypomicroelementose makes up 31.4% and frequency of the zinc deficient hypomicroelementose in the examined girls is 49.2%. The Table 4 shows indices of the microelement status in the examined boys and girls with hypomicroelementose in comparison with the microelement status in relatively healthy boys and girls permanently residing in the conditions of the industrial city of Tashkent.

Table 4. Indices of microelements in relatively healthy teenagers and teenagers with microelements deficiency residing in the city of Chirchik.

Examined	Fe, micromole /l	Cu, micromole/l	Zn, micromole/l
Healthy boys	14.9 ± 0.34	13.2 ± 0.32	15.4 ± 0.42
Boys with microelements deficiency	7.00 ± 0.41	6.03 ± 0.38	8.12 ± 0.38
Healthy girls	13.5 ± 0.42	12.1 ± 0.34	13.9 ± 0.34
Girls with microelements deficiency	6.11 ± 0.35	5.14 ± 0.38	8.00 ± 0.40

As can be seen from the above Table indices of the microelement status in the body of examined boys and girls with hypomicroelementoses are considerably reduced as compared to the indices of the microelement status in the healthy teenagers of the both sex. The Table 5 shows in the comparative aspect frequency of the hypomicroelementoses in the examined children permanently residing in the cities of Tashkent and Chirchik.

Table 5. Frequency of hypomicroelementoses in the examined teenagers of the cities of Tashkent and Chirchik.

Examined	Fe Deficiency ratio	Cu Deficiency ration	Cu Deficiency ration
All examined Tashkent teenagers	37.3%	29.4%	33.3%
All examined Chirchik teenagers	43.8%	32.1%	33.9%
Tashkent boys	35.4%	18.8%	29.2%
Chirchik boys	41.2%	29.4%	31.4%
Tashkent girls	40.7%	27.8%	35.2%
Chirchik girls	54.0%	49.2%	49.2%

As can be seen from the above Table in a comparative aspect both in the whole group, and in a group of boys and girls living in Chirchik hypomicroelementoses frequency increases as compared to the adolescents living in Tashkent, which indicates more evident effect of adverse environmental habitat conditions in Chirchik on the body of the examined adolescents.

CONCLUSIONS

1. Has been revealed considerably high frequency of hypomicroelementoses, caused by deficiency of such essential microelements as Fe, Cu and Zn in adolescences permanently residing in the conditions of an industrial city.

2. Frequency of the detected hypomicroelementoses would seem directly correlates with the degree of the severity of environmental stress on the adolescents' body.

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R E S U M E

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Has been studied the frequency of hypomicroelementhoses detection caused by the deficiency of such essential hematopoietic trace elements as iron, copper and zinc among the adolescents permanently residing in the conditions of industrial cities of Tashkent and Chirchik. It has been shown that in the structure of the identified hypomicroelementhoses prevails Fe deficient hypomicroelementhoses both in boys and girls. The frequency SUMMARY DETECTION OF SOME HEMOPATHICAL of hypomicroelementhoses and the state trace element status of the adolescents' body have been affected by the degree of environmental stress on the body.