SCHOOL AGE AND ADOLESCENTS- ENVIRONMENT HEALTH RISK ASSESSMENT AT PRESENT AND IN FUTURE

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1. Introduction

There are significant social changes in the world: some countries are disintegrated, population is moving from their ancient domiciles, they migrate, there are many refugees and exiled people; violence and wars result in poverty, pain and stress; there are many killed, lost, wounded. Children in this suffering take unenviable place. Social circumstances in our surrounding radically change life values and those new created value systems in the most of unprepared people cause intensive feelings of uncertainty, fear, and emptiness, particularly in young people.

Children are biological potential in each nation and according to census from 1991 they make 30,2 % out of total population in SR Yugoslavia. In the population structure of Republic Srpska (2001), by age groups, there are 28,80 % inhabitants from 0-18 years of age (1) (Nehap). This population group is very sensitive to all changes that have final effects to population in each country. Following numerous factors influences health condition of school-aged children: environment, social standard, culture, habits, customs, nutrition, education, health care etc. In this age bad habits are acquired concerning inadequate nutrition, smoking, drug addiction, alcoholism, sexually transmittable diseases, HIV etc. (2,3,4).

Perspectives and aims of health care development of children, school children and adolescents by the year 2025. (WHO)

WHO recommends as necessary:
* To enable preventive activity through planned work activity programs (health and educational work, systematic check-ups etc.);
* To conduct hygienic and epidemiological activities in all educational institutions;
* To apply and improve all levels of health care of children and young people;
* To popularize and enlarge activities in order to achieve "healthy schools".

World in 21st century

What the life is going to be in 21st century? Whether human life is going to be longer? Are we going to be more healthy and so the children? These are very frequent questions and dilemmas at the same time!

Situation in Serbia
During the period of many years school aged children spend 3 - 6 hours per day, often and more than 30 hours per week in school buildings, mostly in sitting position,

so the best sanitized school building is not suitable ambient for their physical and psychical health. When such ambient has hygienic deficiencies it is also going to have inadequate effects to children health(2-4).

Data on recent investigations conducted by Executive Committee of Vojvodina on frequency, extent and percentage of misuse of alcohol, tobacco, marihuana and other psychotropic substances in Vojvodina certainly confirm that these substances are increasingly present among young people and their misuse is serious health and educational problem.

Most of school objects in our republic is > 40 years old. Even the new built schools in Novi Sad (main town in region of Voivodina, S&CG) have experienced their full age. Analyses with the aim to determine particular segments concerning "sick/healthy buildings" are conducted in our schools sporadically (Novi Sad, S&CG)(2).

Condition of hygiene in elementary schools in Serbia

Microclimate conditions in schools also present certain morbogenous co-factors! In our surroundings there is not enough adequate investigations in this field (Novi Sad, Belgrade) (4-6).

Possible illnesses and conditions

Increasing environmental hazards add their toll to this new pattern of disease, sometimes aggravating pre-existing ill-health, such as asthma, sometimes directly responsible for acute or chronic impairments (toxic, allergic), e.g. lead poisoning in childhood (4-9).

Analysis of morbidity and mortality in our children

Percentage of children in total population of SR Yugoslavia is around 1/10, with decreasing tendency of the number of newborn children (in Vojvodina and Central Serbia) (2) .

According to census from 1991, school children and young people (from 7 to 19 years) make 19,5 % in Serbia and 29,6 % in Kosmet. There are the least adolescents in Vojvodina (6,5 %) and the most in Kosmet (10,9 %). According to the frequency of certain diseases and conditions in total morbidity of this age group of children, the leading diseases are respiratory, digestive system, skin, nervous system diseases, senses as well as "symptoms, signs and undefined conditions". All these diseases participate with 89 % in total pathology of school children.

2. Purpose

Health potential of school aged children and adolescents can be imperilled in conditions of negative environment and work ambient conditions. Analysis of type and scope of these risk factors was the subject of this paper.

3. Methods of work and our results

Within the WHO issue "Health for all in 21st century" were investigated certain elements of the 4th aim (health of young people), 10th aim (healthy and safe physical ambient), as well as the 13th aim (place for healthy living). These investigations were proceeded in 5% of elementary and secondary schools in Novi Sad and encompassed micro and macro-climate elements, quality of ambiental and work ambient air, analysis of object sanitation concerning water-supply and waste matters as well as concerning anthropometric status of school children and adolescents.

Sampling, analysis and interpretation of acquired results were proceeded according to law recommendations (10,11).

Measurements and investigation were in 6 primary schools in Novi Sad during 2001.

Nourish status of pupils was done, according recommending NHANES1 (Graph. 1.)

Microclimate measurement: Air temperature, Air circulation velocity and Relative air humidity (table 1.).

Concentration of : CO, CO_2, NO and NO_X in air, in classrooms (tables 2-5), using Quintox¨-Flue gas analyzer, KM106.

Graph. 1. Nourish status of pupils according to BMI, by sex

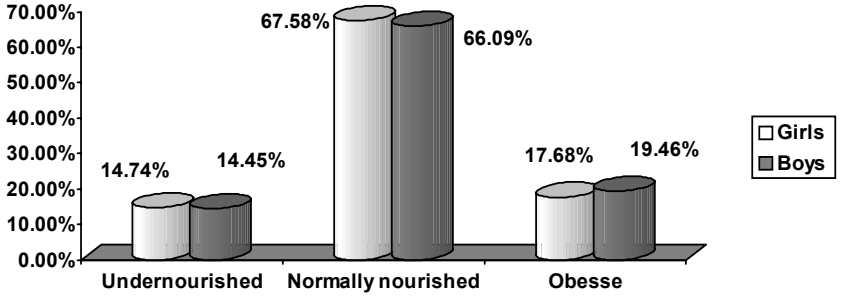

Table 1. Microclimate conditions in classrooms

SCHOOL	Air temperature (^{0}C)				Air circulation velocity (m/s)				Relative air humidity (%)			
	N	Min-max	n	%	N	Min-max	n	%	N	Min-max	n	%
I	5	21.50 – 22.90	3	60	5	0.04 – 0.13	2	40	5	36.3 – 42.9	4	80
Average		22.20				0.09				38.90		
II	3	21.40 – 22.50	2	66.67	3	0.06 – 0.11	2	66.67	3	38.70 – 39.80	3	100
Average		22.10				0.08				39.27		
III	4	21.0 – 21.60	2	50	4	0.30 – 0.49	2	50	4	41.80 – 46.90	0	0
Average		22.27				0.36				45.00		
IV	8	22.50 – 23.90	8	100	8	0.0 – 0.49	5	62.50	8	45.9 – 53.40	0	0
Average		23.29				0.13				48.70		
V	2	26.0 – 26.70	2	100	2	0.0 – 0.04	2	100	2	58.30 – 60.30	1	50
Average		26.35				0.02				59.30		
VI	6	22.60 – 24.20	6	100	6	0.05 – 0.15	3	50	6	64.0 – 69.10	6	100
Average		23.25				0.08				67.68		
Σ	28	**21.0 – 26.70**	23	82.14	28	0.0 – 0.49	16	57.14	28	36.3 – 69.10	14	50
AVERAGE		**22.10 – 26.35**				**0.02 – 0.36**				**38.90 – 67.68**		

Legend:
N-number of measurements,
n-number of measurements out of limited values,
%-percentage of measurements out of limited values

Table 2. Concentration of CO (ppm) in air, in classrooms

SCHOOL	Measured place - classroom N^o 1	Measured place - classroom N^o 2	Measured place - classroom N^o 3	Measured place - classroom N^o 4	Measured place - classroom N^o 5	Measured place - classroom N^o 6	Measured place - classroom N^o 7
I	**1.0**	**1.0**	**1.0**	**1.0**	x	x	x
II	0.0	0.0	x	x	x	x	x
III	0.0	**1.0**	x	x	x	x	x
IV	**1.0**	**1.0**	0.0	0..0	0.0	**1.0**	**1.0**
V	0.0	0.0	x	x	x	x	x
VI	**1.0**	**1.0**	0.0	0.0	x	x	x

Legend:
0.0 – gass is not detected,
x – not analysed classroom

Table 3 . Concentration of CO_2 (ppm) in air, in classrooms

SCHOOL	Measured place - classroom N° 1	Measured place - classroom N° 2	Measured place - classroom N° 3	Measured place - classroom N° 4	Measured place - classroom N° 5	Measured place - classroom N° 6	Measured place - classroom N° 7
I	0.0	**1000**	0.0	**1000**	x	x	x
II	**1000**	**1000**	x	x	x	x	x
III	**1000**	**1000**	x	x	x	x	x
IV	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V	0.0	0.0	x	x	x	x	x
VI	0.0	0.0	**1000**	0.0	x	x	x

Legend:
0.0 – gass is not detected,
x – not analysed classroom

Table 4. Concentration of NO (ppm) in air, in classrooms

SCHOOL	Measured place - classroom N° 1	Measured place - classroom N° 2	Measured place - classroom N° 3	Measured place - classroom N° 4	Measured place - classroom N° 5	Measured place - classroom N° 6	Measured place - classroom N° 7
I	0.0	0.0	0.0	0.0	x	x	x
II	0.0	0.0	x	x	x	x	x
III	0.0	0.0	x	x	x	x	x
IV	**1.0**	**1.0**	0.0	0.0	0.0	**1.0**	0.0
V	0.0	0.0	x	x	x	x	x
VI	0.0	0.0	0.0	**1.0**	x	x	x

Legend:
0.0 – gass is not detected,
x – not analysed classroom

Table 5. Concentration of NO_x (ppm) in air, in classrooms

SCHOOL	Measured place - classroom N° 1	Measured place - classroom N° 2	Measured place - classroom N° 3	Measured place - classroom N° 4	Measured place - classroom N° 5	Measured place - classroom N° 6	Measured place - classroom N° 7
I	0.0	0.0	0.0	0.0	x	x	x
II	0.0	0.0	x	x	x	x	x
III	0.0	0.0	x	x	x	x	x
IV	**1.0**	**1.0**	0.0	0.0	0.0	0.0	0.0
V	0.0	0.0	x	x	x	x	x
VI	0.0	0.0	0.0	**1.0**	x	x	x

Legend:
0.0 – gass is not detected,
x – not analysed classroom

n-number of measurements out of limited values,
%-percentage of measurements out of limited valuesurements out of limited

4. Disscusion

General aims in health policy in Serbia

In accordance to these principles and based on completed analyses and papers general aims of health policy by the year 2010th are created. Within the 5th aim (17,18) concerning children health, school aged and adolescent health it says:

" By the year 2010 it has to be improved health of children and young people with possibilities of complete development of physical and psychical potential.

Activities in the field of "healthy schools"

Education is the key issue concerning the health promotion in school. The complete approach to this issue is given by WHO expert committee in 1995 and result of this are recommendations where three of them are directly related to health effects.

School ambient has to:
a) Enable healthy environment through safety water and sanitary conditions,
b) Protect children of infectious diseases, discrimination, and violence;
c) Breaking of smoking, alcohol and narcotic habits.

Every school has to teach children and adolescents to basic life know ledges: on nutrition, preventive health measures and behavior and habits to direct towards better life conditions. It has to protect and improve health; to enable better food and nutrition and to support growing and development of children; It has to establish preventive program for breaking of smoking, alcohol and narcotic habits, changes in behavior (HIV); Enable preventive check-ups due to identification of certain diseases (sight, hearing), to proceed health education regarding to early pregnancy, vaccination anti-helmint treatments etc.; To conduct law regulations in order to stop selling of cigarettes to young people and through anti-tobacco programs to educate young people about all hazardous effects etc.

5. Conclusions

Acquired results indicate to insufficient space in more than 2/3 of objects which results changed microclimate conditions (increased temperature, decreased air circulation within classrooms - in more than 1/4 of objects, which also disturbs recommendations on optimal humidity). Quality of ambiental air imperls analyzed issues within the object: CO, CO_2, NO, and NO_x. Concentration of CO in 33,33% - and CO_2 in 52.38% samplers are above limited values.

Various risk factors in environmental and work ambient which decrease health potential of analyzed persons were determined and among the leading diseases were registered: respiratory organs diseases, digestive tract diseases, dermal diseases etc. By improving healthy habits in schools can be enabled development without risk factors influences that result in early appearance of disease and in inability, followed by complete coverage of children and young people by measures for improvement of health, prevention and control of disease.

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