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MAIN WAYS OF ADOLESCENTS HEALTH STATUS IMPROVEMENT IN ARMENIA

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Abstract

The article presents results of integrated assessment of adolescent health status conducted for the first time in the Republic of Armenia. The statistically significant association between adolescent morbidity and physical development has been proved through the comparison of information about mentioned indices. The conducted comparative analysis of the results obtained due to application of different type arrangements for preventive examinations of the same adolescents showed an apparent advantage and efficiency of the developed screening tests as the unified scheme for the individual assessment of adolescent health status. Mentioned screening tests were suggested for the use in practical health care. The analysis of variance was used to reveal the significance and degree of influence of separate factors and indices and their interactions with the health status of adolescents.

The results of the study allowed to develop the system of arrangements aimed to improve adolescents health care quality.

Keywords: adolescents, health, integrated assessment, morbidity, physical development, medical check-ups, quality of medical care

Introduction

The issues of effectiveness and quality increase of adolescent health care are critical among health care priorities in the Republic of Armenia (RA). At the same time more emphasis should be placed on the improvement of health care and health protection of schoolchildren [*Olds D., Kitzman H., 1997; Serdula M. et al., 1999; Siervogel R. et al., 1999; Wellness R. et al., 1998*]. The newly developing socioeconomic conditions in our country created preconditions for the formation of market economy and relations, for the rise of open, explicit and hidden unemployment, emerging competition in the labor market. These phenomena directly influenced adolescents' life as well. At the same time, scientific data show that adolescents do not take into account the presence of diseases during the occupational choice, thereby significantly increasing the risk of undermining their health [*Ananyeva N. et al., 1991; Mironov N., 2000; Reznikov S., Drobishev V., 1989*]. Thus, it is evident that the improvement of adolescent health care should be considered as a means of secondary prevention and increase of adolescents working capacity. The urgency of this problem increases due to contradictions between:

- Adverse tendencies in adolescents health status in RA, in particularly, the increase of chronic diseases prevalence in the adolescent population;
- Transition of the country to market economy with the unavoidable increase of qualifying standards for individuals and their health status set forth in a course of labour activity.

Above-mentioned contradictions necessitate the development of theoretical and practical approaches to adolescent health care improvement in new socioeconomic conditions of RA.

Indices of adolescents' physical development, pubescence, and morbidity have worsened recently. During the last decade the number of underweight schoolchildren has increased 1.5 times, while the frequency of identifiable func-

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tional disorders and chronic diseases grew almost by 20% [*Poplin B., Udry J., 1998; Siam C., 1998; Williams R. et al., 2000; Wolf A. et al., 1997*]. At present more than 25% of adolescents have pubescence delay.

Anatomic-physiological peculiarities of adolescents along with socio-hygienic factors induce quite peculiar pattern of morbidity. A large body of literature is available on issues of schoolchildren morbidity study [*Ilyin A., Sheplyagina L., 1999; Katkova I. et al., 1999; Sallies J. et al, 2001; Trojan R. et al., 1998*], different living and upbringing conditions of adolescents being taken into account, many researchers study in details adolescents social groups. The private medical care often becomes a barrier for the systematic schoolchildren sanitation [*Grigoryeva L. 1996; Reznikov S., Drobishev V., 1989; Olds D., Kitzman H., 1997; Pinhas-Hamiel O., Ziegler P., 1998; Weiss H., 1998*]. Many researchers confirm that health care improvement has a significant positive impact on population health status. Appropriate health care organization, which takes into consideration the school age peculiarities will not only support the adolescents' health status but also promote its steady improvement *[Rautavaara O. et al., 2002; Shirr L.,1988; Wang Y., Adder L., 2001*].

Listed above unsolved problems caused the necessity of integrated social-hygienic investigation of adolescents health status in RA.

Material and methods

For the first time in RA the integrated medico-social investigation of adolescents' life style has been conducted and mainly resulted in development of the program "Center and regional groups" for monitoring of harmful habits in adolescents. The integrated method for assessment of health care performance and quality was applied; main principles of pre-medical care and in-depth medical check-ups organization were developed, as well as the method for expert evaluation of adolescents' health care organization and the system of arrangements for its improvement.

A program of integrated social-hygienic study of adolescents health in RA was developed, which included information about the characteristics of the target population, the work content and peculiarities of the used method.

The study was conducted in 11 territorial entities of the RA; Yerevan city was selected as an experimental region.

The calculated sample size for each of the studied phenomena was equal to:

- for all types of morbidity: 10 160 persons;
- for physical development: 2 000;
- for survey: 751;
- for expert evaluation: 1496.

Because of the multiple nature of the considered problem different methods were used: sociological, anthropometric, statistical, multistage sampling, cohort method, method of expert evaluation, method of mathematical-statistical analysis, Bayes method, chi-square test, univariate and multivariate correlation analysis. For the improvement of primary prevention, screening was suggested that enabled the development of scientifically grounded prognoses, early detection of diseases, and assessment of adaptive potentialities of the organism.

The use of screening contributes to the development of individual and mass-coverage health-improving interventions, prevents the development of many chronic diseases.

Results and discussion

According to the results of the study, the rate of chronic pathology revealed by periodic medical check-ups ranged from 162.7 to 238.8 per 1000. This level is higher in young boys in comparison with girls in all RA regions (Figure 1). Diseases of nervous system and organs of sense were the most frequent among all diseases revealed during the check-ups (34.2%±0.55; $p<0.05$).

The prevalence of myopia was the highest (20.7±0.6) in the class of the diseases of nervous system and organs of sense, and it was higher in young boys in comparison with girls (22.1%±0.8 versus 19.3%±0.77; $p<0.05$). The detected pathology in the class of musculoskeletal system diseases included mainly flatfoot (7.4%±0.5), kyphosis and kyphoscoliosis (3.0%±0.3). Chronic diseases of tonsils and adenoids were diagnosed

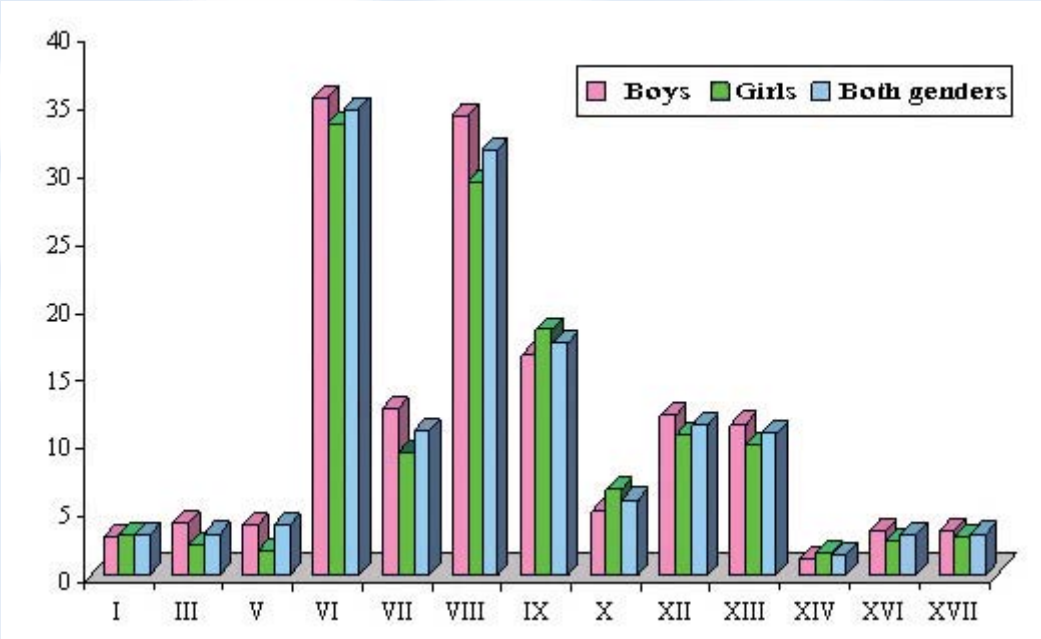

Figure 1. *Mean level of chronic pathology diagnosed at first time in adolescents according to results of medical check-ups (per 1000).*

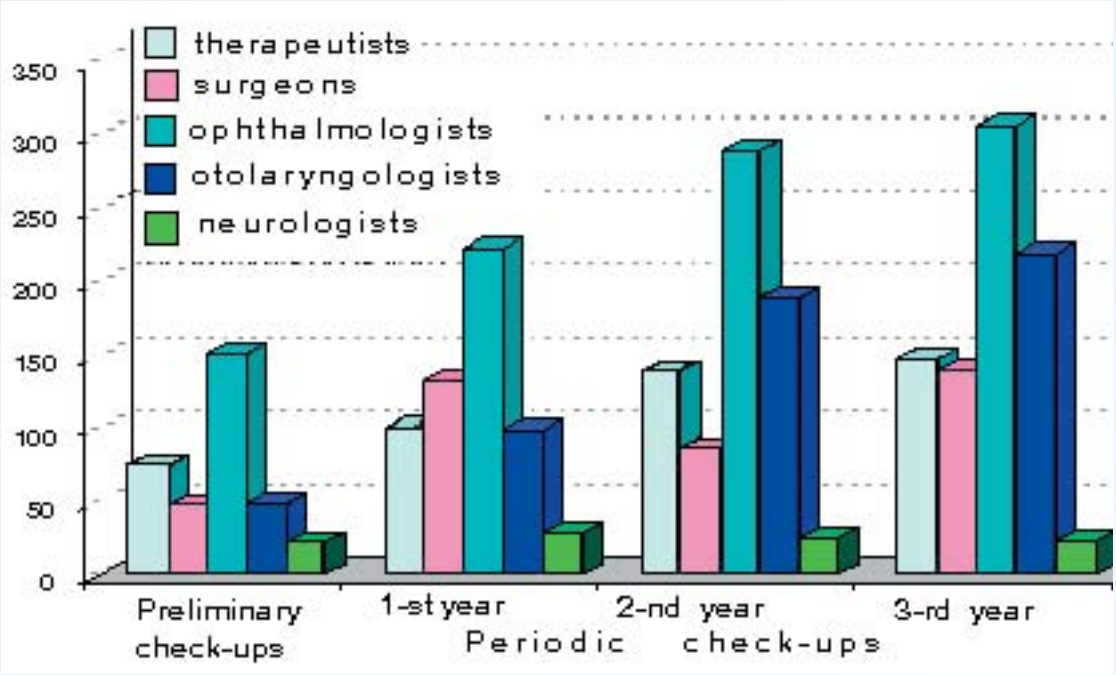

Figure 2. *Levels of chronic pathology diagnosed by different specialists (per 1000).*

most frequently among the class of respiratory system diseases (22.1%±0.4), and their prevalence was 1.2 times higher in boys in comparison with girls (23.8%±0.8 versus 20.4%±0.7; $p<0.05$). The calculated prevalence rates of this pathology were significantly lower in comparison with literature data. According to the findings of several authors [*Olds D. et al., 1999; Trojan R. et al., 1998; Wang J. et al., 2001*] the prevalence ranges from 22% to 130%, which apparently resulted from different approaches of physicians to the diagnostics of these diseases [*Amish A. et al., 2000; Ross C., Hayes D., 2002; Schibbier G. et al., 1997*].

Teeth caries was the most frequent in the class of the digestive organs diseases (13.1%±0.52). The main pathology in the class of circulatory system diseases includes hypertensive type of neurocirculatory dystonia (8.1%±0.3). There is an increase of the prevalence of endocrine, nutritional and metabolic diseases (3.8%±0.26 versus 2.2%±0.02), mental disorders (3.7%±0.25 versus 1.7%±0.26) in boys. The same tendency was revealed in all provinces. It should be mentioned that the prevalence rates of the diseases per 1000 adolescents detected during periodic check-ups were higher. The prevalence rate was 2 times higher for boys than for girls.

The rate of chronic pathology detected during periodic medical check-ups was higher in comparison with the same rate detected during preliminary check-ups (101.2%±5.2 versus 75.2%±4.3). The rate of chronic pathology detected by therapeutists increased. The tendency of chronic pathology detection is higher in boys in comparison with girls (Figure 2).

Thus, the detection of chronic pathology by all specialists during periodic check-ups is higher in comparison with preliminary check-ups. Differences in rates of detected pathology are mainly caused by visual imparement, chronic diseases of respiratory tract (tonsils and adenoids) and musculoskeletal system disorders. This is the evidence of considerable shortcomings of schoolchildren health care organization; particularly it shows the absence of early disease detection by specialists. Presented data shows the necessity of adolescent health care improvement through the inculcation of healthy life style.

Health disorders developed in adolescence decrease the adolescents' abilities to perform their social and biological functions. In this connection, the State should hold an interest in promotion of adolescents' health status, because they form the labour and defense potentials of the country, reproduction, and health of growing generations. The improvement of growing generation's health is possible through the interventions based on the study of adolescent health status and main trends in their development and health rates.

According to the used health grouping it was determined that only 7.9% of adolescents were healthy, 35.9% formed the risk group, 49.1% were sick (the III group of health) and 7.1% formed the IV group of health. The results of the integrated assessment of health status by health groups indicate the decrease of percentage of healthy adolescents.

The index of health group mean (HGM).

In 1991, according to the formula used:

$$HGM = \frac{1 \cdot n_1 + 2 \cdot n_2 + 3 \cdot n_3 + 4 \cdot n_4}{\Sigma n_i}$$

the HGM was equal to:

$$HGM = \frac{1 \cdot 128 + 2 \cdot 788 + 3 \cdot 640 + 4 \cdot 4}{1560} = 2.3.$$

It should be mentioned that the values of HGM and heath status have inverse negative relationship. The low HGM corresponds to the high health status and vice versa. The low level is the level below 2.0, moderate - within the range from 2.0 to 2.5, and high level: 2.5 and above.

In 1991 adolescents had health level

$$HGM_{actual} = \frac{1 \cdot 26 + 2 \cdot 574 + 3 \cdot 786 + 4 \cdot 114}{1600} = 2.6$$

In 2004 HGM was high, and the health level correspondingly was low.

Index of regular medical check-ups effectiveness (IRME) was estimated by:

$$IRME = \frac{HGM - HGM_{actual}}{HGM} \times 100\%$$

and was equal to

$$IRME = \frac{2.3 - 2.6}{2.3} \times 100\% = -13.0\%$$

In case of effective clinical examination and its positive result IRME is positive; in case of reverse indices it is negative.

For boys:

$HGM_{initial}$ = 2.3 (mean value) the moderate health level in 1991;

HGM_{actual} = 2.0 (high value) low health level in 2004;

IRME = - 99.9% (ineffective clinical examination and its negative results).

For girls:

$HGM_{initial}$ = 2.4 moderate health level in 1991;

HGM_{actual} = 3.8 low health level in 2004;

IRME = - 58.3% (ineffective clinical examination and its negative results).

Adolescents' regular medical check-ups in RA anticipate not only the increase of their number, but also significant increase of their quality through the implementation of the most effective modes of operation. However, the adolescents' regular medical check-ups in RA have formal character and, year by year, they become more and more declarative. Existing forms of medical check-ups lose their meaning because they do not have social basis in newly created structures of the State authorities. The effectiveness of medical check-ups is very low in outpatient clinics. The main reason is the absence of unified medical approaches for the adolescent health status evaluation. So, there is a necessity for development and implementation of methods for integrated evaluation of adolescent health status in health care.

Thus, negative trends in adolescent health status in RA have been revealed in RA during the last decade. There is the necessity of searching contemporary approaches for the adolescent health care improvement in new socioeconomic conditions of RA.

The department of Public Health and Health Care Organization of YSMU developed the system for organization of mass medical check-ups based on the program of screening tests and aimed at the improvement of adolescents' regular medical check-ups in rural areas. This system reduces expenditures on preventive check-ups and allows selecting the group of conditionally healthy adolescents with gastrointestinal, respiratory, and musculoskeletal systems disorders at the stage of pre-medical examination.

For the assessment of the program effectiveness in rural areas, where the main therapeutical and preventive care is performed by nurses, the investigation was conducted in three regions of RA (Ararat, Armavir, Gegharkunik).The study embraced more than 3000 adolescents. The investigation confirmed the possibility to apply the method in rural areas. The screening test allowed the four-fold increase in detection of morpho-functional disorders and two-fold increase in detection of chronic diseases. It was also revealed that adolescents in rural areas have 2.5 times more frequent gastrointestinal, nervous and organs of sense disorders than teenagers in urban areas, that is conditioned by the shortcomings of adolescents' preventive check-ups organization in rural areas of RA. The conducted integrated medical examination of boys and girls aged 15 to 18 years was aimed to study trends in dynamics of adolescents' health status in RA during the last decade. The sample included 3160 adolescents. The study program foresaw three stages.

The first stage (screening) included the collection of anamnesis information, anthropometry, assessment of physical development and pubescence, measuring of visual acuity. At the second stage the examination was conducted by specialists (neurologists, ophthalmologists, otolaryngologists, orthopaedist-traumatologists, therapeutists). At the third stage the integrated estimation of health status was conducted.

It was revealed that in rural areas physicians using the traditional scheme of preventive check-ups usually do not detect the deviations of physical development. The comparison of results obtained due to different methods of the same adolescents exanimation showed that traditional scheme detected chronic pathology only in 21.6%

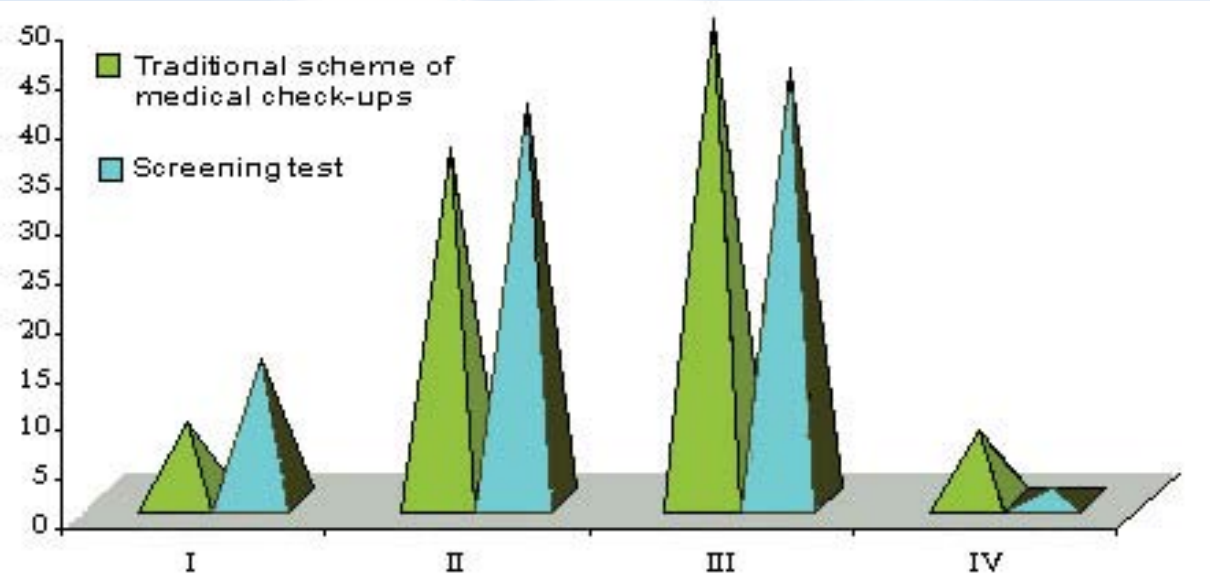

Figure 3. *Distribution of adolescents by health groups according to results of different forms of preventive check-ups (per 100).*

of adolescents, whereas screening tests – in 44.0% of adolescents (Figure 3).

Thus, preventive check-ups revealed the high morbidity in adolescents in rural areas. This is connected with the relatively low accessibility of complete medical and specialized outpatient care for adolescents in rural areas in comparison with urban areas. During health promotion activities it is recommended to widely use rural outpatient's clinics, on the base of which in summer it would be possible to establish preventive clinics. It is recommended to fill in the suggested "Adolescents Medical Books", which include information about the diagnosis and the recommended health promotion procedures. This will allow increasing the effectiveness of adolescents' health care in rural areas.

The analysis of morbidity dynamics shows that the structure of pathology detected in adolescents has changed dramatically. The increase of prevalence of functional disorders and chronic diseases took place due to the increase of the prevalence of upper respiratory tract chronic diseases, digestive organs diseases, circulatory system disorders, as well as musculoskeletal system, nervous system and sense organs pathology. The cumulative frequency of mentioned diseases increased from 45.1% to 59.8% and became dominant among adolescence somatic pathology. As a result of the increase of diseases prevalence they become of high social significance. The reason is that in many cases they cause limitations for the professional education, recruitment for military services, i.e. they decrease the abilities for social adaptation and integration not only in adolescence but also in future life. The diseases of musculoskeletal system, visual organs, digestive, and respiratory systems compose the largest proportion (68.2%) among functional disorders.

The identical structure was also detected as a result of chronic pathology analysis: leading rank places belong to diseases of respiratory, digestive, visual, and musculoskeletal system organs. The cumulative frequency of the mentioned diseases composes 67.9% of all pathology revealed in adolescents. The most unfavorable picture of the health status is observed for boys. The prevalence of functional disorders and chronic diseases among them is equal to 290.1 (per 1000). Disorders and diseases of neuropsychic (48.4%), musculoskeletal (57.6%), digestive (38.2%) systems are considerably widespread (Table 1).

Table 1.

The level of pathology involvement in adolescents in RA according to the results of preventive check-ups (per 1000 adolescents)

Class/Disease group	1991			2004		
	boys	girls	total	boys	girls	total
Functional disorders	140.7	189.9	165.3	160.7	189.7	175.3
Chronic diseases	73.0	91.9	82.5	96.0	89.8	92.9
Point prevalence	213.7	281.8	247.7	256.7	279.5	268.6

In order to solve these problems it is necessary to establish systems for adolescents health monitoring aimed to make timely and adequate decisions on issues of organization and maintenance of preventive, medical and health promotion measures. For this purpose, the results of preventive medical check-ups are of high value due to the basic task of obtaining objective health information.

Among patients taken under the preventive clinical supervision, the leading place belongs to patients with diseases of nervous system and sense organs (25.1%), then come diseases of respiratory organs (21.9%), digestive organs (11.9%), musculoskeletal system (9.1%), diseases of circulatory system (7.4%), diseases of the skin and subcutaneous tissue (6.6%). Patients with these diseases compose 82% of all sick adolescents being under a preventive clinical supervision.

A study on physical development was one of the aspects of integrated estimation of adolescent health status. It serves as the sensitive indicator of changes in adolescent body. Each anthropometric index reflects the certain aspect of physical development, use of all indices helps to estimate the harmonicity of the organism development.

In literature there are only few reports, discussing the issues of physical development, issues of presence of different types of pathology in individuals [*Hamaganova T. et al., 1998; Shtulberg M., 1998; Petersen A. et al., 1998; Pinhas-Hamiel O., Ziegler P ., 1998*]. In these papers, the study on adolescents' health includes only findings on their physical development or morbidity or both indices, but the results of the studies did not lead to the unambiguous conclusion concerning the existence of the relationship between these indices. During the study, information about morbidity was compared with the adolescents' length and body mass. The obtained results showed that in all age groups adolescents with good physical development had the least proportion of diseases.

For instance, it was revealed that in all age groups of adolescents with medium height, the largest proportion of diseases was in underweight schoolchildren. In 15-years-old adolescents this proportion ranged from 37.3% in boys to 40.0% in girls; in 16-years-old, the ratio varied from 40.5% in girls to 47.9% in boys; in 17-years-old adolescents — from 40.4% in girls to 44.5% in boys.

The largest proportion of diseases in the group of 15-17 aged boys and girls with height below the average was in underweight adolescents. In all age groups of adolescents with height values above the average, the largest proportion of diseases was in overweight schoolchildren. In 15-years-old adolescents this proportion ranged from 50.9% in boys to 51.2% in girls; in 16-years-old adolescents - from 44.4% in girls to 47.3% in boys; in 17-years-old adolescents — from 57.4% in girls to 57.8% in boys.

It has been proved that regional regression scales nowadays remain the most simple and reliable means for the population monitoring of physical development.

The unified chart for the individual assessment of physical development was developed due to our efforts. It was then used as a basis for the "screening test" tables suggested for the practical health care.

The tables are simple enough and allow easily differentiating the contingent of adolescents and selecting the so-called risk groups.

The use of tables allows to distinguish adolescents with normal physical development (body mass within the range from M-1σR to M+2σR at any height, except for low height), as well as adolescents with developmental divergence: underweight adolescents (with body mass below M-1σR — deficiency), overweight adolescents (body mass above M+2σR — surplus) and short adolescents (below M-2σR— low body length).

The integrated assessment of physical development and morbidity by classes of diseases showed that in all age groups boys with average (normal) physical development have the lowest proportions of diseases of all classes.

The proportion of diseases of nervous system and sense organs, respiratory organs, digestive organs in adolescents with middle height was higher among underweight adolescents in all age groups.

Thus, the study of adolescent health status has shown that deviations of physical development and disharmony of the morphological status, as a rule, are combined with deviation in health status, maximal and minimal values of body mass have stronger influence as in case of the maximum, as well as at the minimum height.

Overweight and underweight are recognized as the risk factors for health disorders origination. Interventions directed to the decrease of the proportion of overweight and underweight persons by activating the healthy lifestyle elements (physical activity and rational nutrition) are always included in the programs of integrated disease prevention.

It is thus assumed that achievement of certain positive changes in the overweight and underweight prevalence will result in considerable successes in population health promotion and lead to the decrease of the prevalence of diseases related to underweight and overweight. Indeed, the results of numerous researches showed that such diseases as different nosological forms of cardiovascular system, several chronic diseases of upper respiratory tract and others are more frequent in overweight persons. In some cases, the rates differ from 1.5 to 2 times.

On the other hand, the certain group of diseases, such as neuroses, several respiratory and digestive organs diseases, are more frequent in underweight persons. In each age group, the crude prevalence rate is calculated taking into account all diseases: either connected, or not connected with the physical development.

Thus, it might be assumed that in case of positive changes, only prevalence of conjugate group of diseases will change in crude morbidity spectrum. However, it should be mentioned that the morbidity rates of groups of diseases connected with underweight or overweight are not the same, and the crude rates are also sufficiently different.

The following hypotheses were stated: the proportion of overweight persons decreases in the population, that is, there is a transfer of persons from overweight group in group with normal physical development (it is assumed that persons who transfer from one group into another change their characteristics connected with conjugate pathology prevalence), the theoretical effect of opposite change, the increase of the proportion of overweight persons by 50% (hypothesis about continuation of negative tendency) and the variant of complete elimination of all deviations of physical development, that is, both overweight, and underweight.

The following formula was used for calculations

$$N=10^{-3}[P_1(N_1+0.5N_4)+(P_2\times N_2)+(P_3\times N_6)]+10^{-4}(P_4\times 0.5N_4)$$

where: N- number of sick men in the population;

$P_{1,2,3,4}$ – indices of prevalence in different groups of physical development;

$N_{1,2,3,4}$- number of people in different groups of physical development.

For other variants calculations were similar.

Table 2.

Supposed changes of the pathology prevalence (in %) at the conditional decline of the proportion of overweight individuals by 50% in the adolescent population

Diseases	The actual prevalence rate		The prevalence rate (per 100) at the conditional decline of the proportion of overweight individuals by 50% in the adolescent population	
	boys	girls	boys	girls
Diseases of nervous system and sense organs	31.3	28.5	25.0	24.2
Diseases of circulatory system	46.3	52.2	23.2	26.1
Diseases of the respiratory system	32.0	28.5	24.0	20.0
Diseases of the digestive system	21.1	31.3	16.9	25.0
Diseases of the musculoskeletal system and connective tissue	47.1	44.1	35.3	33.1
General pathology	34.3	35.5	27.4	30.1

The decrease of the proportion of overweight people in a population by 50% changes the crude rate and leads to the drastic changes of connected pathology prevalence either in boys or in girls (Table 2).

The decrease of the proportion of underweight people in the population by 50% changes the crude rate and leads to the drastic changes of connected pathology prevalence (diseases of nervous system and sense organs, diseases of the digestive system, diseases of the musculoskeletal system and connective tissue) both in boys and in girls (Table 3).

The preventive programs propose considerably large changes in adolescent health status. The calculations show that elimination of all de-

Table 3.

Supposed changes of the pathology prevalence (in %) at the conditional decline of the proportion of underweight individuals by 50% in the adolescent population

Diseases	The actual prevalence rate		The prevalence rate (per 100) at the conditional decline of the proportion of underweight individuals by 50% in the adolescent population	
	boys	girls	boys	girls
Diseases of nervous system and sense organs	46.5	40.3	36.3	34.3
Diseases of circulatory system	37.4	29.2	33.7	26.6
Diseases of the respiratory system	44.2	38.8	38.0	33.0
Diseases of the digestive system	48.3	41.6	35.7	31.2
Diseases of the musculoskeletal system and connective tissue	29.1	33.2	22.7	24.6
General pathology	41.1	36.6	33.3	29.9

viations of physical development results in drastic positive changes in pathology prevalence, while the increase of proportion of underweight and overweight persons by 50% causes sharp negative changes.

Algorithm 29. Influence of physical development on morbidity rates

Diseases	η^2	F_i	$F_{st}(p\leq0.05, p\leq0.01)$
General Morbidity	0.42	4.83	3.1;4.9;8.1
Diseases of nervous system and sense organs	0.31	3.1	3.1;4.9;8.1
Diseases of circulatory system	0.94	94.0	3.1;4.9;8.1
Diseases of the respiratory system	0.52	7.4	3.1;4.9;8.1
Diseases of the digestive system	0.33	3.3	3.1;4.9;8.1
Diseases of the musculoskeletal system and connective tissue	0.33	3.3	3.1;4.9;8.1

The used analysis of variance has shown the significant influence of the group of physical development on morbidity rate ($F_i>F_{st}$, $P\leq0.005$). The degree of influence of this factor at its different gradations ranges from 31% to 94%. The variation of this index in several classes of diseases cannot be explained by the influence of only physical development factor (diseases of nervous system and sense organs, diseases of the digestive system, diseases of the musculoskeletal system and connective tissue), although the proportion of its influence is great enough (31%-33%). This fact gives evidence on insignificance of the influence of separate indices of physical development, but confirms the role of their combined influence (Figure 4).

In cases when the influence of one factor is not similar at different gradations of another factor, the value of the combined influence index increases.

Thus, the strong influence of combinations of gradations revealed in the studied complex ($P<0.05$) indicates the strong relationship between the influence of the index of physical development and morbidity.

Using multivariate (two-factor) analysis of variance the significance and the degree of influence of different indices of adolescent health status on the dependent variable has been revealed. The influence of the combination of several factors, the role of each factor, and the comparison of their influence have been studied.

The influence of the first factor (A) in the studied complex was 0.27 (27%) from the total set of factors influencing the dependent variable

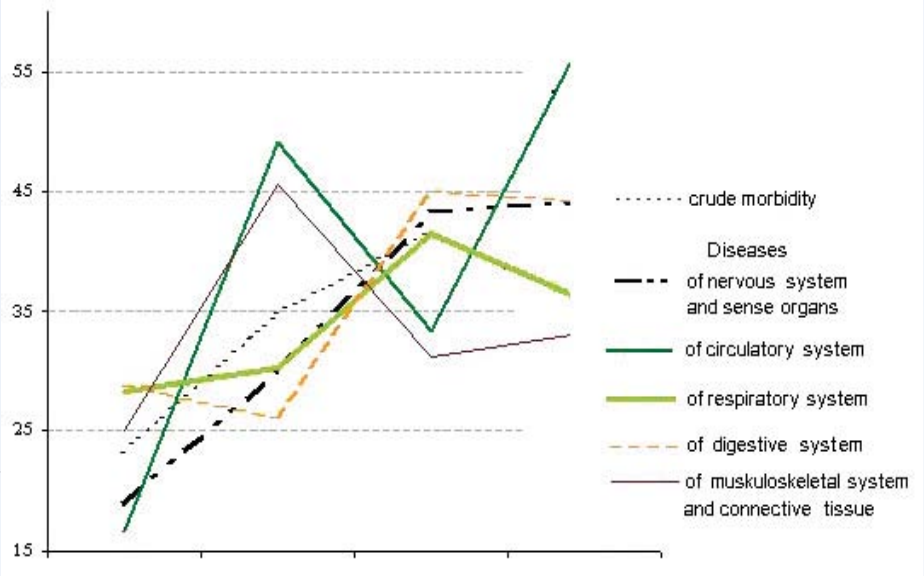

Figure 4.
The influence of different physical development gradation on morbidity rate in adolescents.

(B—morbidity) ($F_i \geq F_{st}$). The influence of the second factor at the mean influence of the first was more powerful.

Action of the second factor at the mean action of the first one appeared to be more insignificant ($\eta_B^2 = 0.03$ (3%), $F_i < F_{st}$). Of higher significance was the influence of a combination of gradations ($\eta_{AB}^2 = 0.31$ (31%), $F_i > F_{st}$, $P \leq 0.05$) and the summary influence of both factors ($\eta_X^2 = 0.52$ (52%), $F_i = F_{st}$, $P = 0.05$).

Thus, the statistical analysis of obtained data allows more rational planning of interventions directed to the health promotion and health care improvement. The decrease of morbidity rates with the simultaneous decrease of the degree of influence of the systematically influencing factors will allow more unbiased assessment of the conducted medical interventions.

Using analysis of variance the significance and the degree of influence of the physical development on the dependent variable (morbidity rate by gender) was calculated.

The index was statistically significant in boys for the crude morbidity rate ($\eta_X^2 = 0.62$ (62%), $F_i \geq F_{st}$) and for the diseases of circulatory system ($\eta_X^2 = 0.89$ (89%), $F_i \geq F_{st}$). For these groups the influence of factors, which were not taken into account, was equal correspondingly: $\eta_z^2 = 0.38$ (38%) and $\eta_z^2 = 0.11$ (11%). The influence of the factor of physical development in girls made correspondingly: for crude morbidity rate - $\eta_X^2 = 0.52$ (52%), $F_i \geq F_{st}$, for the diseases of circulatory system - $\eta_X^2 = 0.78$ (78%), $F_i \geq F_{st}$, and for the diseases of the digestive system - $\eta_X^2 = 0.62$ (62%), $F_i \geq F_{st}$.

The index of the degree of influence (η_X^2) for the rest classes of diseases was not significant - $F_i \leq F_{st}$. The increase or decrease of morbidity rate cannot be explained only by the influence of physical development, although the degree of its impact to the morbidity is high enough. The indices of the strength of influence η^2 indicate that the change of the level of morbidity in cases of the variation of the group of physical development cannot be explained by the influence of only one factor ($F_i < F_{st}$), although in some cases the degree of their influence on the variation of the morbidity level is significant. This fact gives evidence concerning the insignificance of the influence (for several classes of diseases) of separate indices of physical development, but confirms the role of their combined influence.

Thus, in general, there is a nonlinear relationship between the groups of physical development and the dynamics of morbidity.

The physical development is a sufficiently stable and multicomponent index of adolescent health status, which reflects the population heterogeneity.

The prognosis for chronic disease prevalence in the nearest future is unfavorable: it is supposed that by 2010 the chronic pathology, including the pathology of nervous system, skin and subcutaneous tissue, as well as mental disorders, will increase by 15.2%.

Suggestions for the adolescent health care improvement in RA

It is expedient to use the Medical-and-social Profile of adolescents of Armenia for the organization of timely complex work aimed at adolescents' health promotion and upbringing, as well as for the development of the differentiated system of health care taking into account individual prognosis of the risk of health worsening.

For the development of the system of continuous medical control of adolescents, it is necessary to reform the system of their health care. It is expedient to establish modern establishments for adolescents' health care provision, centers on adolescents' health promotion, centers of reproductive health, and psychological centers with preventive orientation.

The strategic directions of in-patient care suppose the development of adolescents' health care provision forms, which will take the place of in-patients clinics: introduction of daytime in-patient departments into the work of medical preventive institutions.

It is recommended to establish the departments of adolescents' medico-social care in all children outpatient clinics and to develop contemporary scientifically based technologies for adolescents' health promotion in educational establishments.

It is necessary to develop the program for the training of psychologists, specialists on social work in children outpatients' clinics.

For the creation of the system of epidemiological surveillance over the prevalence of smoking, alcohol use among adolescents, and also for the development of adequate preventive interventions, it is necessary to establish "The center for monitoring of harmful habits among children and adolescents", and in regions — "The groups for monitoring of harmful habits among children and adolescents".

For the formation of healthy life style among adolescents, it is necessary to increase the quality of sanitary-hygienic advertising among adolescents and their families.

The implementation of the complex program "Adolescents health status for the period from 2008 to 2020" was recommended for the improvement of system approach and adolescents health management.

For the schoolchildren health promotion in Armenia some projects of WHO on the development of school health care might be used: "Global school initiative of health promotion", "European network of schools of health promotion".

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