TEN-YEAR TRENDS IN SCHOOL-RELATED MORBIDITY AMONG CHILDREN AND ADOLESCENTS IN RUSSIA

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The effects of educational environment factors and processes on the increasing incidence of certain functional disorders and chronic diseases, which can collectively be referred to as school-related diseases, is a relevant issue of childhood and adolescence hygiene. Seeking to prioritize preventive effort directions, this study aimed to analyze trends in overall and primary morbidity from these diseases among Russian children and adolescents from 2015 to 2024. The data collected for the descriptive analysis covered children (0–14 years old) and older adolescents (15–17 years old); they were officially reported by the Central Research Institute for Organization and Informatization of Healthcare. We assessed the dynamics of morbidity at the level of classes of diseases and certain disease entities, and calculated the disease chronization indices (DCIs). The data were systematized and analyzed in Microsoft Office Excel 2020. The study suggests criteria for classifying certain health disorders as school-related. We identified persistent morbidity trends (noticeable throughout the study period) for individual ICD-10 classes, and observed high DCI values for diseases of the eye, the musculoskeletal system, and mental disorders. These findings may be associated with increased psycho-emotional stress, educational and visual demands, and insufficient physical activity. The analysis of morbidity trends identified the following priority areas for preventive work: promoting physical activity among schoolchildren, reducing psycho-emotional stress associated with examinations in grades 9 and 11, teaching students how to arrange their educational and leisure activities, promoting healthy nutrition, and increasing sleep duration.

Keywords: preventive medicine, children and adolescents, school-related diseases, overall and primary morbidity, disease chronization index

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ДЕСЯТИЛЕТНЯЯ ДИНАМИКА ЗАБОЛЕВАЕМОСТИ ДЕТЕЙ И ПОДРОСТКОВ РОССИИ ШКОЛЬНО-ОБУСЛОВЛЕННЫМИ БОЛЕЗНЯМИ

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Актуальной проблемой гигиены детей и подростков является влияние факторов учебной среды и напряженного образовательного процесса на рост заболеваемости некоторыми функциональными нарушениями и хроническими болезнями, которые условно можно отнести к «школьно-обусловленным нарушениям здоровья». Цель исследования — проанализировать динамику общей и первичной заболеваемости детей и подростков России школьно-обусловленными болезнями за 2015–2024 гг. для обоснования приоритетных направлений профилактической работы. Выполнен дескриптивный анализ общей и первичной заболеваемости детей (0–14 лет) и старших подростков (15–17 лет) школьно-обусловленными болезнями на основании данных, опубликованных в официальных статистических сборниках ФГБУ «ЦНИИОИЗ» МЗ РФ. Определены динамика заболеваемости по классам болезней и отдельным нозологиям и показатели хронизации заболеваний. Систематизация информации и статистический анализ проведены в электронных таблицах Microsoft Office Excel 2020. Представлено обоснование критериев отнесения определенных нарушений здоровья к «школьно-обусловленным». Выявлены устойчивые неблагоприятные тенденции динамики заболеваемости по отдельным классам МКБ-10, наблюдавшиеся в течение 10 лет в детско-подростковой популяции, и высокие значения показателя хронизации заболеваний по классам болезней глаза, костно-мышечной системы, психическим расстройствам, что может быть связано с увеличением психоэмоционального напряжения, учебной и зрительной нагрузки, гиподинамии. Анализ динамики заболеваемости показал, что приоритетными направлениями профилактической работы должны стать увеличение двигательной активности, снижение психоэмоционального напряжения при подготовке к экзаменам в 9 и 11 классах, обучение школьников рациональной организации учебной и досуговой деятельности, здоровое питание и увеличение времени сна.

Ключевые слова: профилактическая медицина, дети и подростки, школьно-обусловленные болезни, общая и первичная заболеваемость, показатель хронизации

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Numerous Russian and foreign studies conducted in isolated school cohorts suggest that educational environment, excessive workload, high academic performance requirements, pre-exam stress, digitalization of education, disrupted daily routine and nutrition patterns, low physical activity, and poor sleep significantly contribute to the deterioration of the health of schoolchildren [1–7]. The prevalence of certain functional disorders and chronic diseases that can be conditionally labeled "school-related health disorders" is growing in this population [8, 9]. Such disorders include both functional disruptions associated with uneven development of organs and body systems (typically transient course and not requiring medical attention), and diseases with a more severe chronic course that necessitate intervention. There is a certain connection between hereditary background and school-related health disorders; they may have different etiology and pathogenesis, but generally meet the following criteria:

– such disorders occur in 5% or more of schoolchildren;

– the severity of pathological processes and the prevalence of disorders increase from junior high school to high school.

School-related health disorders reduce the quality of life of schoolchildren and have social consequences, such as restrictions on service in the armed forces and limited choice of professions.

Functional disorders, such as neurotic reactions, postural disorders, and spasm of accommodation, are virtually excluded from the official statistics. Their prevalence can be established only in the context of a research that includes a thorough medical examination of children [10].

Official statistics document school-related diseases that are predominantly chronic. They are recorded using Form No. 12 "Number of Cases on the Medical Organization's Service Area" at first diagnosis and considered in the primary incidence analysis, and exacerbations, which are also recorded, are added to the dataset for overall prevalence analysis [1, 8, 9].

The grounds for classifying certain diseases as school-related are the links between the development of pathologies, educational environment, and behavioral health risk factors.

– myopia. Its pathogenesis is largely associated with high visual strain (including screen use), insufficient physical activity, and prolonged sitting in a static position; in the ICD-10 classification, myopia belongs to Chapter VII (H), "Diseases of the eye and adnexa" [11–13];

– neuroses, somatoform dysfunction of the autonomic nervous system, tension type headache. These conditions are caused by chronic neuro-emotional and examination-related stress, overwork, insufficient sleep, didactogenic influences, and school-related phobias; in ICD-10, they are assigned to Chapter V (F), "Mental and behavioural disorders," and Chapter VI (G), "Diseases of the nervous system" [1, 14–18];

– diseases of the circulatory system involving high blood pressure. Such diseases are associated with neuro-emotional and examination-related stress, overwork, insufficient sleep; they belong to Chapter IX (I), "Diseases of the circulatory system" [8, 16, 18];

– obesity (simple, constitutionally exogenous). This disease, often concomitant with disrupted carbohydrate metabolism, is caused by insufficient physical activity and poor nutrition (excessive calorific value); in ICD-10, it is described in Chapter IV (E), "Diseases of the endocrine system, eating disorders and metabolic disorders" [19, 20];

– chronic gastritis and duodenitis. Although these diseases have a helicobacterial etiology, they are also, in part, complex psychosomatic disorders linked to psychological stress, poor nutrition, and irregular daily routines; they belong to Chapter XI (K), "Diseases of the digestive system" [21, 22];

– deforming dorsopathies (including grade I–II scoliosis). The development of these pathologies is associated with insufficient physical activity, prolonged sitting in a static position, functionally incorrect posture at the workplace, and furniture mismatching height; they are classified in Chapter XIII (M), "Diseases of the musculoskeletal system and connective tissue" [23, 24].

– menstrual disorders in girls. Psychosomatic by nature, these disorders are associated with great nervous and emotional stress, stress caused by frequent tests, exam preparation, etc.; in ICD-10, they belong to Chapter XIV (N), "Diseases of the genitourinary system" [25, 26].

The dynamics of the overall and primary morbidity of the above-mentioned pathologies and classes of diseases to which they belong reflect the main trends in the changing health status of modern children and older adolescents.

This study aimed to prioritize prevention directions by analyzing the trends in overall and primary morbidity of Russian children (0–14 years old) and adolescents (15–17 years old) with school-related diseases in 2015–2024.

METHODS

For the analysis, we used data on the prevalence of school-related diseases and their primary morbidity among children (0–14 years old) and older adolescents (15–17 years old). The timeframe was 2015–2024; the data was collected from the official statistical publications of the Central Research Institute for Organization and Informatization of Healthcare [27]. In Russian medical practice, researchers calculate relative values per 100,000 population within the respective age cohort, using the procentimille ($^0/_{0000}$) indicator. The overall and primary morbidity for menstrual disorders is calculated for the number of girls under 15 and under 18, respectively.

Overall and primary morbidity data were analyzed using descriptive methods, and the percent change in morbidity rates in 2024 versus 2015, as well as the disease chronization index (DCI), were calculated. DCI, the ratio of overall morbidity to primary morbidity, was determined for 2015 and 2024. The index and the criteria underlying it have been proposed by public health experts [28]. DCI under 2 is considered "insignificant," from 2 to 4 — "significant," above 4 — "high."

MS Office Excel 2020 spreadsheets (Microsoft; USA) were used for accumulation, systematization of information and descriptive analysis.

An expert-analytical approach was applied to review data on the relationship between educational environment factors and schoolchildren's lifestyle, on the one hand, and the dynamics of school-related disease incidence and pathologies' chronization, on the other. The objective was to substantiate a package of preventive measures.

The article examines the dynamics of overall and primary morbidity among children and adolescents, focusing only on ICD-10 chapters and individual nosologies that can be conditionally regarded as school-related diseases.

RESULTS

During the ten-year period under consideration, **overall morbidity among children** aged 0–14 years **increased slightly by 0.3%** — from $223920.7^0/_{0000}$ to $224565.2^0/_{0000}$ (Table 1).

Overall, within the ten years under consideration, the overall morbidity has grown for diseases of the endocrine system and metabolic disorders — by 37.1%, from $3944.2^0/_{0000}$ to $5407.4^0/_{0000}$; in particular, the number of obesity cases

Table 1. Morbidity due to school-related diseases among children aged 0–14 years: trends in incidence and chronization, 2015–2024

Classes of diseases according to ICD-10	Morbidity (per 100,000 children of the considered age)			Incidence trends, 2024 vs. 2015 (%)	Chronization	
	Type of morbidity	2015	2024		2015	2024
All diseases	Overall	223 920.7	224 565.2	+0.3	1.25	1.31
	Primary	179 741.3	171 683.9	–4.5		
Diseases of the endocrine system, metabolic disorders	Overall	3944.2	5407.4	+37.1	2.62	3.53
	Primary	1504.6	1533.3	+1.9		
including obesity	Overall	1217.6	1780.6	+46.2	3.19	3.99
	Primary	382.0	445.9	+16.7		
Mental disorders and behavioral disorders	Overall	2940.2	2853.7	–2.9	5.33	5.42
	Primary	552.0	526.1	–4.7		
Nervous system diseases	Overall	9115.3	9328.8	+2.3	2.4	3.11
	Primary	3802.9	3002.8	–21.0		
Diseases of the eye and adnexa	Overall	12074.1	13402.8	+11	2.02	3.07
	Primary	5981.9	4359.7	–27.1		
including myopia	Overall	3547.9	4712.0	+32.8	3.56	4.31
	Primary	997.6	1093.9	+9.7		
Diseases of the circulatory system	Overall	1980.3	1847.0	–6.7	2.71	3.72
	Primary	730.9	496.8	–32.0		
including diseases involving high blood pressure	Overall	60.8	46.6	–23.4	2.87	3.11
	Primary	21.2	15.0	–29.2		
Diseases of the digestive system	Overall	13272.7	11039.5	–16.8	1.81	2.52
	Primary	7322.3	4385.5	–40.1		
including gastritis and duodenitis	Overall	1919.2	1309.4	–31.8	2.64	3.33
	Primary	725.8	392.9	–45.9		
Diseases of the musculoskeletal system and connective tissue	Overall	7581.3	8777.8	15.8	2.26	3.57
	Primary	3356.3	2458.5	–26.7		
including deforming dorsopathy	Overall	2236.1	2183.3	–2.4	2.62	3.53
	Primary	852.8	619.1	–27.4		
Diseases of the genitourinary system	Overall	5443.1	4732.0	–13.1	1.9	2.04
	Primary	2863.8	2323.6	–18.9		
including menstrual disorders	Overall	1592.0	1967.6	+23.6	1.51	1.56
	Primary	1055.8	1259.7	+ 19.3		

has increased by 46.2%, from 1217.6‰ to 1780.6‰. The overall incidence of diseases of the nervous system has grown slightly by 2.3%, from 9115.3‰ to 9328.8‰. The overall morbidity from diseases of the eye and adnexa rose significantly by 11.0% (from 12074.1‰ to 13402.8‰), including a 32.8% increase in myopia (from 3547.9‰ to 4712.0‰). Morbidity from diseases of the musculoskeletal system and connective tissue increased by 15.8%, from 7581.3‰ to 8777.8‰. The overall morbidity from diseases of genitourinary system decreased, but the incidence of menstrual disorders has grown by 23.6%, from 1592.5‰ to 1967.6‰.

We registered a *downward morbidity trend* for the following classes of diseases: mental disorders and behavioral disorders — 2.9% (from 2940.2‰ to 2853.7‰); diseases of the circulatory system — 6.7% (from 1980.3‰ to 1847.0‰), including those that involve elevated blood pressure — 23.4% (from 60.8‰ to 46.6‰); diseases of the digestive system — 16.8% (from 13272.7‰ to 11039.5‰), including gastritis and duodenitis — 31.8% (from 1919.2‰ to 1309.4‰); diseases of the genitourinary system — 13.1% (from 5443.1‰ to 4732.0‰), with increasing prevalence of menstrual disorders in girls. In addition, there was a slight decrease in the overall incidence of deforming dorsopathies — by 2.4% (from 2236.1‰ to 2183.3‰), although the overall prevalence of diseases of the musculoskeletal system among children increased.

Over the considered ten-year period, the **primary incidence among children decreased by 4.5%**, from 179741.3‰ to 171683.9‰ (Table 1).

We have registered a *decline of primary incidence among children* for the following classes: mental disorders and behavioral disorders, dropped by 4.7%, from 552.0 ‰ to 526.1‰; diseases of the nervous system, by 21.0%, from 3802.9‰ to 3002.8‰; eye diseases, by 27.1%, from 5981.9‰ to 4359.7‰, however, primary incidence of myopia has increased. Other disorders that have decreased over the considered period are: diseases of the circulatory system — by 32.0% (from 730.9‰ to 496.8‰), including diseases involving elevated blood pressure — by 29.2% (from 21.2‰ to 15.0‰); diseases of the digestive system — by 40.1% (from 7322.3‰ to 4385.5‰), including gastritis and duodenitis — by 45.9% (from 725.8‰ to 392.9‰); diseases of the musculoskeletal system — by 26.7% (from 3356.3‰ to 2458.5‰), including deforming dorsopathies — by 27.4% (from 852.8‰ to 619.1‰); diseases of the genitourinary

Table 2. Morbidity due to school-related diseases among adolescents aged 15–17 years: trends in incidence and chronification, 2015–2024

Classes of diseases according to ICD-10	Morbidity (per 100,000 children of the considered age)			Incidence trends, 2024 vs. 2015 (%)	Chronization	
	Type of morbidity	2015	2024		2015	2024
All diseases	Overall	224 725.9	234 669.9	+4.4	1.62	1.61
	Primary	138 509.7	145 437.3	+5.0		
Diseases of the endocrine system, metabolic disorders	Overall	9898.4	11914.6	+20.4	3.46	3.86
	Primary	2864.4	3087.2	+7.8		
including obesity	Overall	2935.0	3799.1	+29.4	3.97	4.47
	Primary	738.8	850.7	+15.0		
Mental disorders and behavioral disorders	Overall	6303.6	5394.2	–14.4	5.78	7.46
	Primary	1089.8	723.4	–33.6		
Nervous system diseases	Overall	12542.5	12299.6	–1.9	3.16	3.24
	Primary	3969.8	3799.3	–4.3		
Diseases of the eye and adnexa	Overall	21622.6	24466.8	+13.2	3.36	4.39
	Primary	6437.7	5578.6	–13.3		
including myopia	Overall	11689.4	14431.2	+23.5	5.37	5.93
	Primary	2177.8	2432.5	+11.7		
Diseases of the circulatory system	Overall	5477.0	4905.3	–10.4	3.31	3.35
	Primary	1655.0	1463.3	–11.6		
including diseases involving high blood pressure	Overall	596.5	481.1	–19.3	3.51	3.28
	Primary	169.9	146.9	–13.5		
Diseases of the digestive system	Overall	19117.8	14352	–24.9	2.59	2.81
	Primary	7374.9	5110.5	–30.7		
including gastritis and duodenitis	Overall	6239.9	4151.7	–33.5	3.78	3.73
	Primary	1649.9	1112.2	–32.6		
Diseases of the musculoskeletal system and connective tissue	Overall	17392.9	19547.7	+12.4	2.93	3.81
	Primary	5936.6	5127.8	–13.6		
including deforming dorsopathy	Overall	7239.3	7446.1	+2.9	3.38	3.94
	Primary	2144.6	1891.0	–11.8		
Diseases of the genitourinary system	Overall	11342.4	10008.9	–11.8	1.91	1.97
	Primary	5952.8	5079.4	–14.7		
including menstrual disorders	Overall	5416.6	7029.6	+29.8	1.61	1.77
	Primary	3373.9	3981.7	+18.0		

system — by 18.9% (from 2863.8$^0/_{0000}$ to 2323.6$^0/_{0000}$), with the increase in the frequency of menstrual disorders.

Within the same period, we recorded an *increase in the primary morbidity* with the diseases of the endocrine system and metabolic disorders — by 1.9% (from 1504.6$^0/_{0000}$ to 1533.3$^0/_{0000}$).

A noteworthy development is the increase of primary incidence of the diseases conventionally considered school-related, including obesity, which has grown by 16.7% (from 382.0$^0/_{0000}$ to 445.9$^0/_{0000}$), myopia — by 9.7% (from 997.6$^0/_{0000}$ to 1093.9$^0/_{0000}$), and menstrual disorders — by 19.3% (from 1055.8$^0/_{0000}$ to 1259.7$^0/_{0000}$).

The **overall morbidity among adolescents** aged 15 through 17 years has **increased by 4.4%**, from 224725.9$^0/_{0000}$ to 234669.9$^0/_{0000}$ (Table 2).

We have registered an *increase of the overall morbidity* from the following classes: diseases of the endocrine system and metabolic disorders — by 20.4% (from 9898.4$^0/_{0000}$ to 11914.6$^0/_{0000}$), including obesity — by 29.4% (from 2935.0$^0/_{0000}$ to 3799.1$^0/_{0000}$); diseases of the eye and adnexa — by 13.2% (from 21622.6$^0/_{0000}$ to 24466.8$^0/_{0000}$), including myopia — by 23.5% (from 11689.4$^0/_{0000}$ to 14431.2$^0/_{0000}$); diseases of the musculoskeletal system and connective tissue — by 12.4% (from 17392.9$^0/_{0000}$ to 19547.7$^0/_{0000}$), with the incidence of deforming dorsopathies growing by 2.9% (from 7239.3$^0/_{0000}$ to 7446.1$^0/_{0000}$). The overall incidence of menstrual cycle disorders has increased by 29.8% (from 5416.6$^0/_{0000}$ to 7029.6$^0/_{0000}$).

The *overall morbidity* from the following classes of diseases has *decreased* in adolescents: mental, behavioral and neurodevelopmental disorders — by 14.4% (from 6303.6$^0/_{0000}$ to 5394.2$^0/_{0000}$); diseases of the nervous system — by 1.9% (from 12542.5$^0/_{0000}$ to 12299.6$^0/_{0000}$); diseases of the circulatory system — by 10.4% (from 5477.0$^0/_{0000}$ to 4905.3$^0/_{0000}$), including diseases involving elevated blood pressure — by 19.3% (from 596.5$^0/_{0000}$ to 481.1$^0/_{0000}$); diseases of the digestive system — 24.9% (from 19117.8$^0/_{0000}$ to 14352.0$^0/_{0000}$), including a marked decrease in the prevalence of gastritis and duodenitis — by 33.5% (from 6239.9$^0/_{0000}$ to 4151.7$^0/_{0000}$); diseases of the genitourinary system — by 11.8% (from 11342.4$^0/_{0000}$ to 10008.9$^0/_{0000}$), with an increase in the prevalence of menstrual disorders.

In 2015–2024, the **primary morbidity of adolescents** from all the considered diseases combined **increased by 5.0%**, from

138509.7‰ to 145437.3‰, mainly due to a significant increase (by 22.9%) in the primary incidence of respiratory diseases.

There was a marked growth of primary morbidity of adolescents from the diseases of the endocrine system and metabolic disorders — by 7.8%, from 2864.4‰ to 3087.2‰), including obesity — by 15.1%, from 738.8‰ to 850.7‰. The primary incidence of myopia has increased by 11.7%, from 2177.8‰ to 2432.5‰, although overall incidence of eye diseases has dropped. The primary morbidity from menstrual disorders has increased by 18.0% (from 33737.9‰ to 3981.7‰), while the general indicator of the diseases of the genitourinary system has decreased.

We have registered a *decline in primary morbidity of adolescents* from the following classes: mental disorders — by 33.6% (from 1089.8‰ to 723.4‰); diseases of the nervous system — by 4.3% (3969.8‰ to 3799.3‰); eye diseases — by 13.3% (from 6437.7‰ to 5578.6‰); diseases of the circulatory system — by 11.65% (from 1655.0‰ to 1463.3‰), including diseases involving elevated blood pressure — by 13.5% (from 169.9‰ to 146.9‰); diseases of the digestive system — by 30.7% (from 7374.9‰ to 5110.5‰), including gastritis and duodenitis — by 32.6% (from 1649.9‰ to 1112.2‰); diseases of the musculoskeletal system — by 13.6% (from 5936.6‰ to 5127.8‰), including deforming dorsopathies — by 11.8% (from 2144.6‰ to 1891.0‰).

We conducted a comparative analysis of **DCIs** in the child and adolescent subpopulations in 2015 and 2024 (Tables 1 and 2). It was found that in the children's subpopulation, the DCI for all diseases has remained almost unchanged over the decade: in 2015 it was 1.25, in 2024 — 1.31; in the subpopulation of adolescents, the DCI was higher, but it has also not changed considerably: 1.62 in 2015, 1.61 in 2024.

Significant chronization of diseases in ***children*** (2.00 < DCI < 4.00) was detected in 2015 and in 2024 for most classes of diseases that include school-related varieties: diseases of the endocrine system and metabolic disorders — DCI 2.62 and 3.53, respectively; obesity — 3.19 and 3.99; diseases of the nervous system — 2.40 and 3.11; eye diseases — 2.02 and 3.07, including myopia — 3.56 in 2015; diseases of the circulatory system — 2.71 and 3.72, including diseases involving high blood pressure — 2.87 and 3.11; diseases of the digestive system — 1.81, a minor DCI in 2015, and 2.52, a significant DCI in 2024, including gastritis and duodenitis — 2.64 and 3.33; diseases of the musculoskeletal system — 2.26 and 3.57, including deforming dorsopathies — 2.62 and 3.53.

Significant chronization of diseases in ***adolescents*** (2.00 < DCI < 4.00) was detected in 2015 and 2024, also for most classes of diseases that include school-related varieties: diseases of the endocrine system (3.46 and 3.86, respectively); diseases of the nervous system (3.16 and 3.24); diseases of the eye and adnexa (3.36 — significant DCI in 2015 and 4.39 — high DCI in 2024); diseases of the circulatory system (3.31 and 3.35), including diseases involving high blood pressure (3.51 and 3.28); diseases of the digestive system (2.59 and 2.81), including gastritis and duodenitis (3.78 and 3.73); diseases of the musculoskeletal system (2.93 and 3.81), including deforming dorsopathies (3.38 and 3.94).

In both children and adolescents, we registered *high chronization* (DCI > 4) of mental disorders in 2015 and 2024: 5.33 and 5.42, and 5.78 and 7.46, respectively. Adolescents also exhibited high chronization of obesity in 2024 (4.47) and myopia in 2015 and 2024 (5.37 and 5.93, respectively). Among children, myopia's DCI was high in 2024: 4.31.

In 2015 and 2024, the chronization *was insignificant* (DCI < 2.00) only for the diseases of the genitourinary system — both in children (1.90 and 2.04) and in adolescents (1.91 and 1.97) — and menstrual disorders — DCI 1.51 and 1.56 among girls under 15, and 1.61 and 1.77, respectively, among girls aged 15–18 years. This trend suggests that the mentioned disorders are transient in most cases, triggered by lasting stress associated with exams.

A comparison of DCI for children and adolescents revealed that generally in these populations the chronization of the diseases was higher in 2024 than in 2015.

Older adolescents exhibited higher chronization values than children. We registered a very high DCI (up to 7.46 in 2024) for mental disorders in the population of adolescents. Other reasons for concern are the ever-increasing obesity and myopia chronization values among both children and adolescents. By the late stages of adolescence, schoolchildren carry an accumulated burden on chronic diseases, which affects the overall morbidity among them.

Preventive efforts in schools should be aimed at arresting the development of school-related diseases that tend to become chronic.

DISCUSSION

Until 2025, it was not possible to study the dynamics of the incidence of a number of diseases that may be associated with the influence of factors of the educational process and lifestyle of schoolchildren. Order of the Federal State Statistics Service No. 543 of November 13, 2024, which entered into force on January 1, 2025, approved changes to the reporting Form No. 12: addition of "Section 3.2. Students in educational organizations (ages 3 through 17 years): preschoolers and schoolchildren" and new lines enabling registration of almost all school-related diseases [29]. The information collected from 2025 will allow for a deeper and more differentiated analysis of morbidity in four age groups: preschoolers 3–6 years old, younger schoolchildren 7–10 years old, middle school students 11–14 years old (grades 5–8), and school students 15–17 years old (grades 9–11).

To obtain the most complete picture of the health status of children and adolescents, it is necessary to combine data on their treatment in medical organizations with information from preventive medical examinations (including detected pathological lesions), while maintaining individual (per capita) records of all identified health disorders for each child. This approach will yield information on the true (exhaustive) morbidity of children and adolescents.

Analyzing how students' true morbidity correlates with conditions and organizational features of upbringing and education in specific institutions, as well as with behavioral risk factors, will help quantify the contribution of these factors to the most common diseases among preschoolers and schoolchildren. The effectiveness of preventive interventions will be assessed by the degree to which they prevent the impact of adverse factors on the health of children and adolescents, including the onset of functional disorders, progression to chronic disease, and overall disease progression. [8, 9, 15, 21].

CONCLUSIONS

The expert-analytical study identified persistently unfavorable trends in overall morbidity among children and adolescents over the 2015–2024 decade. The indicators increased for the following classes of diseases: diseases of the eye

and adnexa, including myopia; diseases of the endocrine system and metabolic disorders, including obesity; diseases of the musculoskeletal system.

A comparison of data on chronization of diseases in children and adolescents in 2024 and 2015 showed more chronic cases in 2024 than in 2015, with the chronization rates higher in older adolescents than in children aged 0–14 years. Notably high values of the chronization index are observed for eye diseases, diseases of the musculoskeletal system, and especially mental disorders. Increasing chronization of mental disorders, eye diseases (myopia), and diseases of the musculoskeletal system may be associated with a stronger psychoemotional stress, academic and visual load, insufficient sleep and physical activity.

Based on the study data, preventive efforts should focus on reducing the psychoemotional stress among adolescents preparing for exams in grades 9 and 11; promoting physical activity in the considered populations (at least an hour a day); teaching all schoolchildren the rational organization of educational and leisure activities implying smaller visual load; ensuring a healthy diet and increasing the duration of night sleep.

To further study the health status of children and adolescents and associated health risk factors, a unified Russian database is needed. This database should contain a complete record of all healthcare encounters by each minor with any medical organization, as well as information on health disorders (both functional disorders and chronic diseases) detected during preventive medical examinations.

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