REPORTS OF MORPHOLOGY

*Official Journal of the Scientific Society of Anatomists,
Histologists, Embryologists and Topographic Anatomists
of Ukraine*

journal homepage: <https://morphology-journal.com>

The structure of morbidity of secondary school children

Sotnikova-Meleshkina Zh. V.

V.N. Karazin Kharkiv National University, Kharkiv, Ukraine

ARTICLE INFO

Received: 31 August, 2020

Accepted: 30 September, 2020

UDC: 616.1/9-057.874-055.1/3-071

CORRESPONDING AUTHOR

e-mail: zhanna.v.sotnikova@karazin.ua
Sotnikova-Meleshkina Zh.V.

*Intensification of the educational process is one of the risk factors for increasing the prevalence of morphofunctional disorders, acute and chronic somatic morbidity, mental and behavioral disorders, maladaptation syndrome. Many researchers have found a negative chronological dynamics of school health and a high incidence among secondary school students. The purpose of the study is a comparative analysis of the structure and dynamics of morbidity of children during secondary school. The study involved more than 266 students of secondary schools aged 10 to 14 years. The state of health was assessed according to preventive medical examinations conducted by specialists of the Institute of Child and Adolescent Health of the National Academy of Medical Sciences of Ukraine with the informed consent of parents and according to the bioethical norms of the Helsinki Declaration (as amended in 2013). Statistical data processing was performed using the licensed package SPSS Statistic v.20 using Student's *t* test. The highest level of morbidity was found in diseases of the endocrine system ($468.4 \pm 39.7\%$), the organ of vision and the appendix ($322.8 \pm 37.2\%$), the circulatory system ($310.1 \pm 36.8\%$) and respiration ($303.8 \pm 36.6\%$). Among girls, endocrine ($520.7 \pm 57.7\%$) and ophthalmological pathology ($386.7 \pm 56.2\%$) were more often registered, and among boys - mental and behavioral disorders ($168.7 \pm 39.9\%$; $p < 0.05$). During the training, negative dynamics was determined for diseases of the endocrine system (due to a probable increase in their number among boys, at $p < 0.05$), diseases of the digestive system, eye and appendages due to decreased visual acuity ($p < 0.01$). In the structure of endocrine pathology, 60% were thyroid diseases in both sexes, and the prevalence of grade 1 obesity was higher among boys ($p < 0.05$). Mental and behavioral disorders were mainly represented by disorders of activity and attention in adolescent boys, sleep disorders - in girls; hyperkinetic behavioral disorders - in both sex groups. Gender features in the structure and dynamics of morbidity of secondary school students to a greater extent in diseases of the endocrine system, eye and appendix with a general negative tendency to increase the prevalence of these groups of diseases.*

Keywords: morbidity, structure of diseases, students, secondary school age, adolescent boys, girls.

Introduction

Intensification of the educational process is one of the important risk factors for increasing cases of morphofunctional disorders, acute and chronic somatic diseases, mental and behavioral disorders, maladaptation syndrome. Progressive increase of mental disorders and diseases of the nervous, digestive and urogenital system more than 2-3 times, ophthalmological - 4.1 times, endocrine - 7 times during training in general secondary education [3, 6, 9, 22]. Determining the characteristics of the state of health should take into account that nowadays chronic diseases are more and more common in the form of combined pathology, which complicates the diagnosis,

treatment and, moreover, prevention of pathological conditions.

Against the background of increasing the prevalence of morbidity is experiencing significant negative changes and lifestyle of school-age children, which is determined by a significant imbalance of ways of organizing leisure in the direction of passive activities. Decreased physical activity of adolescents is not only a poor physical form, but also a factor in the development of significant somatic and psychological problems in adolescents [5, 7, 21]. A high medical and social problem is the high prevalence of endocrine pathology, including childhood obesity, as

excessive fat deposition is associated with decreased cognitive abilities, school performance and professional achievement in the future [18, 23].

One of the main criteria of health is the level of pathological involvement of children and adolescents. Ukrainian researchers have found a negative chronological dynamics of the health of schoolchildren and the highest incidence among secondary school students. It is during this school period that the formation of certain classes of diseases (so-called "school diseases") is noted [30]. The leading place among them is occupied by pathology of the eye, first of all - myopia. Modern researchers consider the following factors as the main risk factors for the formation and spread of ophthalmic pathology among schoolchildren: intensification of the educational process, increase of school and extracurricular time, uncontrolled screen time, unregulated use of technical teaching aids [3, 10, 11, 19, 20].

The secondary school age is characterized by two physiological crises (puberty and puberty), which are deepened by changes in the education system and social maturation. That is why adolescence is considered as a period of increased susceptibility to stress, the leading factors in the formation of which are a large amount of educational material, tight learning schedule, lack of time to repeat and consolidate educational material, too frequent control of knowledge, competitive educational environment. It is at this age that the highest physiological "value" of learning and academic success is determined [15, 26, 29].

The purpose of the study is a comparative analysis of the structure and dynamics of morbidity of children during secondary school.

Materials and methods

The longitudinal study involved 266 students of secondary schools aged 10-14 years. The state of health was assessed according to preventive medical examinations conducted by specialists of the SI "Institute of Child and Adolescent Health of the National Academy of Medical Sciences of Ukraine" with the informed consent of parents and according to the bioethical norms of the Helsinki Declaration (as amended in 2013).

Medical examinations were performed three times: at the beginning, in the middle and at the end of secondary school with the involvement of a pediatrician, endocrinologist, ophthalmologist, psychoneurologist, cardiologist and gastroenterologist. According to the results of the survey of schoolchildren according to the International Classification of Diseases (ICD-10), the following indicators of morbidity were determined: its general level and main classes of diseases of the endocrine, respiratory, nervous, cardiovascular, digestive system, eye disorders, mental and behavioral disorders. Additionally, the internal structural characteristics of morbidity are given with the determination of the percentage contribution of certain groups of diseases to its general

level and by individual nosological groups.

Statistical data processing was performed using the licensed SPSS Statistic v.20 package using Student's t test.

Results

At the beginning of secondary school, the total pathological incidence was 1683.5‰, and its highest level was found in diseases of the endocrine system (468.4±39.7‰), the organ of vision (322.8±37.2‰), circulatory system (310.1±36.8‰) and respiratory (303.8±36.6‰).

Some sex differences in the structure of diseases have been established (Fig. 1). Thus, if in both sex groups the first rank was occupied by diseases of the endocrine system, then among boys the second and third rank places were occupied by diseases of the respiratory system (361.4±51.9‰) and blood circulation (313.3±51.4‰), and in girls, respectively, ophthalmic (386.7±56.2‰) and cardiovascular pathology (306.7±53.2‰) (Fig. 1).

In addition, the higher prevalence among girls of the endocrine system pathology (520.7±57.7‰ against 421.7±54.7‰ in boys), diseases of the visual organ (respectively 386.7±56.2‰ and 265.1±52.7‰) drew attention. Among boys, mental and behavioral disorders were registered more often than in the group of girls (168.7±39.9‰ and 40.00±22.6‰, respectively; $p<0.05$). During secondary school, the negative dynamics of endocrine system diseases appearance due to their probable increase in the group of examined boys ($p<0.05$) was established. It should be noted that the increase in the incidence of diseases of the eye and digestive organs was in both groups ($p<0.01$). At the same time, there was a decrease in morbidity in diseases of the respiratory system ($p<0.05$) due to their decrease among girls (Table 1.).

Additionally, the structure of endocrine pathology as the most common class of diseases among secondary school children was analyzed (Fig. 2). It has been established that the leading pathology is thyroid disease, which accounts for more than 60% of schoolchildren of both sexes, regardless of the stage of education, except for boys aged 14-15. The prevalence of diffuse goiter of the 1st degree ranged from 265.1±48.5‰ in boys and 413.3±56.9‰ in girls at the beginning of secondary school to 241.0±46.9‰ and 373.3±55.9‰ respectively at the end of training. The second place was occupied by 1st degree obesity, the prevalence of which was higher among boys, but this figure reached a significant difference only at the end of training: 156.6±39.9‰ against 40.00±22.60‰ in girls ($p<0.05$) (Fig. 2).

Disorders of growth included only its delay, which was registered in 8.6% of boys at the beginning of training and in 13.2% - in the middle of training. At the end of the study, tallness was found in 4.0% of students, and growth retardation was found in 8.0%. In the female sex group, the inverse ratio of these disorders was determined, namely: there were two to three times more girls with high growth

Fig. 1. The structure of the incidence of secondary school age students (%).

Table 1. Sex and age features of morbidity of secondary school students, %, (M±m).

Class of diseases	at the beginning of training		at the end of training	
	boys	girls	boys	girls
Diseases of the endocrine system	421.7±54.2	519.9±57.7	602.4±53.7#	599.9±56.6
Diseases of the eye	265.1±48.4	386.7±56.2	433.7±54.4*#	599.9±56.6#
Diseases of the circulatory system	313.3±50.9	306.7±53.2	373.5±53.1	413.3±56.9
Diseases of the respiratory system	361.4±52.7	239.9±49.3	253.0±47.7*	106.7±35.6#
Mental and behavioral disorders	168.7±41.1*	39.99±22.63*	84.33±30.50	39.99±22.63
Diseases of the nervous system	48.19±23.51	79.99±31.33	60.24±26.11	119.99±37.50
Diseases of the digestive system	36.14±20.49	39.99±22.63	192.8±43.3##	146.7±40.9#

Notes: the presence of statistically significant differences between boys and girls (* - $p < 0.05$); in the dynamics of learning (# - $p < 0.05$; ## - $p < 0.01$).

than with growth retardation.

In the middle of secondary school, 36.1±20.5% boys and 13.3±13.2% girls were reported to be at risk of sexual delay. It should be noted that at the end of training 6.0% of boys and 6.7% of girls were diagnosed with endocrine pathology, namely: hypothalamic syndrome and dyspituitarism, which led to delayed sexual development.

Mental and behavioral disorders, which were more common in middle school boys, in 1/3 of cases were represented by disorders of activity and attention, and in 20-30% of students - hyperkinetic behavioral disorders. Among girls, the proportion of sleep disorders doubled during

training, and 50% of girls in the middle of training had signs of hyperkinetic disorders.

The prevalence of diseases of the eye was probably higher among girls ($p < 0.05$) during the entire study due to decreased visual acuity, which progressed in both sex groups from 272.0±35.4‰ to 430.4±39.4‰ ($p < 0.01$). The prevalence of accommodation disorders increased during secondary school, but insignificant and amounted to 15% of all ophthalmic pathology.

The distribution of students by health groups during secondary school is analyzed (Fig. 3).

It was found that, regardless of sex and stage of study,

Fig. 2. Structure of endocrine pathology of secondary school age students (%).

Fig. 3. Distribution of secondary school age students by health groups (%).

more than 80% of schoolchildren entered health groups 1 and 2. At the same time, among boys this distribution probably did not change, and the percentage of girls probably increased (by 9.3%). This percentage was included in group 2 due to 1 group of health ($p < 0.05$). There is no significant difference between students of different sexes in terms of health groups.

Discussion

An important role in the period of sexual development, which coincides with the middle school age, is played by thyroid hormones, which are involved in metabolic processes, bone and skeletal formation, growth process, development of sexual characteristics [16, 17].

In our study, we found that the most common diseases of

the endocrine system, and the first place in secondary school students of both sexes are diseases of the thyroid gland and account for 2/3 of all endocrine pathology. At the same time, growth retardation was registered in almost 10% of boys, sexual dysfunction in every sixth adolescent boy, which was twice as common as among girls of the same age group.

Previous studies have shown that oxidative stress caused by an imbalance of thyroid hormones in hypothyroidism affects testosterone levels and, consequently, the formation of hypoandrogenism in boys [1, 8, 16, 24]. There is a direct correlation between the content of thyroid hormones and nutritional status, fat content in the body [4]. The development of a child during early childhood and puberty is influenced by both the quality of nutrition and a number of neuroendocrine, genetic and environmental factors [14, 23, 31].

Attention should be paid to the almost doubling of the prevalence of ophthalmic pathology, where the leading place is occupied by myopia, which, according to world literature, is formed mainly in middle school age. Foreign researchers have found an increase in the prevalence of myopia during training and its direct correlation with age, sex, body mass index (BMI) and the type of educational institution, which coincides with our studies, which proved the predominance of visual pathology among girls and its likely increase during [2, 12, 13, 25].

Cohort studies have shown that the risk factors for the development of acquired myopia are the intensification of the educational process, educational achievements, low levels of natural and artificial lighting, the use of LED lamps when doing homework, reading disorders (distance less than 25 cm), insufficient night sleep and time spent outdoors, low level of physical activity, living in an urban environment [10, 11, 19, 20, 32]. Scientific confirmation of this fact was reflected in our previous research on the impact of risk factors from irrational regimes and lifestyles of secondary school students on the subjective and objective assessment of their health, including the formation of endocrine, ophthalmic, cardiorespiratory system, mental and behavioral disorders [27, 28].

A promising area of research is the further study of the structure of morbidity of students with different levels of academic success in the dynamics of general secondary education.

Conclusions

1. The highest level of morbidity was found in diseases of the endocrine system, vision, circulatory and respiratory systems.

2. Sex features in the structure and dynamics of morbidity of secondary school students to a greater extent found for diseases of the endocrine system, eye with a general negative tendency to increase the prevalence of these groups of diseases.

References

[1] Adekola, S. A., Charles-Davies, M. A., Onifade, A. A., & Okoli, S. U. (2016). Oxidative Stress Biomarkers and Their Relationship

with Testosterone in Male Auto Mechanics in Ibadan, Nigeria. *Brit. J. Med. Res.*, 12(9), 1-11. doi: 10.9734/BJMMR/2016/22350

- [2] Alabi, A. S., Aribaba, O. T., Alabi, A. O., Ilo, O., Onakoya, A. O., & Akinsola, F. B. (2018). Visual impairment and ocular morbidities among schoolchildren in Southwest, Nigeria. *Niger. Postgrad. Med. J.*, 25(3), 166-171. doi: 10.4103/npmj.npmj_85_18. <https://pubmed.ncbi.nlm.nih.gov/30264768/>
- [3] Antipkin, Yu. G., Volosovets, O. P., Maidannik, V. G., Berezenko, V. S., Moiseenko, R. O., Vygovska O.V. ... Mozyrskaya, O. V. (2018). Status of child population health - the future of the country (part 1). *Child health*, 13(1), 1-11. doi: 10.22141/2224-0551.13.1.2018.127059
- [4] Ayala-Moreno, M. R., Guerrero-Hernandez, J., Vergara-Castaneda, A., Salazar-Aceves, G., & Cruz-Mercado D. E. (2018). Thyroid function in pediatric population with different nutritional status. *Bol. Med. Hosp. Infantil Mexico*, 75(5), 279-286. doi: 10.24875/BMHIM.M18000036
- [5] Baceviciene, M., Jankauskiene, R., & Emeljanovas, A. (2019). Self-perception of physical activity and fitness is related to lower psychosomatic health symptoms in adolescents with unhealthy life. *BMC Public Health*, 19, 980. doi: 10.1186/s12889-019-7311-2.
- [6] Bielikova, I. V., Pluzhnikova, T. V., Krasnova, O. I., Zviagolska, I. N., & Derev'yanko, T. V. (2020). Analysis of morbidity and disability among children in the city of Poltava, Wiad. Lek., 73(6), 1296-1298. <https://pubmed.ncbi.nlm.nih.gov/32723972/>
- [7] Bodnar, I. R., & Kindzera, A. B. (2016). Leisure of ukrainian schoolchildren and place of motor functioning in it. *Pedagogy, Psychology and Medical and Biological Problems of Physical Education and Sports*, 5, 10-18. doi: 10.15561/18189172.2016.0502.
- [8] Cheserek, M. J., Wu, G. R., Ntazinda, A., Yong-Hui, Sh., Li-Ye, Sh., & Guo-Wei, Le. (2015). Association Between Thyroid Hormones, Lipids and Oxidative Stress Markers in Subclinical Hypothyroidism. *J. Med. Biochem.*, 34(3), 323-331. doi: 10.2478/jomb-2014-0044
- [9] Darivemula, S. B., Nagoor, K., John, K. R., Kahn, P. S., & Chittooru, C. S. (2020). Morbidity profile of children from birth to 18 years of age referred for intervention to the district early intervention centre in a District Hospital, Andhra Pradesh. *Indian J. Public Health*, 64(1), 55-59. doi: 10.4103/ijph.IJPH_11_19
- [10] Giloyan A., Harutyunyan T., & Petrosyan V. (2017). Risk Factors for Developing Myopia among Schoolchildren in Yerevan and Gegharkunik Province, Armenia. *Ophthalmic Epidemiol.*, 24(2), 97-103. doi: 10.1080/09286586.2016.1257028
- [11] Grzybowski, A., Kancierz, P., Tsubota, K., Lanca, C., & Saw, S.-M. (2020). A review on the epidemiology of myopia in school children worldwide. *BMC Ophthalmol.*, 20(1), 27. doi: 10.1186/s12886-019-1220-0
- [12] Guo, Y., Duan, J. L., Liu, L. J., Sun, Y., Tang, P., Lv, Y. Y. ... Jonas, J. B. (2017). High myopia in Greater Beijing School Children in 2016. *PLoS One*, 12(11), e0187396. doi: 10.1371/journal.pone.0187396
- [13] Harrington, S. C., Stack, J., Saunders, K., & O'Dwyer, V. (2019). Refractive error and visual impairment in Ireland schoolchildren. *Br. J. Ophthalmol.*, 103(8), 1112-1118. doi: 10.1136/bjophthalmol-2018-312573
- [14] Jansen, E. C., Zhou, L., Perng, W., Song, P. X., Rojo, M. M.T., Mercado, A. ... Cantoral, A. (2018). Vegetables and lean proteins-based and processed meats and refined grains -based dietary patterns in early childhood are associated with pubertal timing in a sex-specific manner: a prospective study of children from Mexico City. *Nutr. Res.*, 56, 41-50. doi: 10.1016/j.nutres.2018.04.021
- [15] Johnstone, J. M., Roake, C., Sheikh, I., Mole, A., Nigg, J. T., & Oken, B. (2016). School-based mindfulness intervention for stress reduction in adolescents: Design and methodology of an open-label, parallel group, randomized controlled trial. *Contemporary Clinical Trials Communications*, 4, 99-104. <https://doi.org/10.1016/j.conctc.2016.07.001>
- [16] Kashkald, D. A., Kosovtsova, G. V., Turchina, S. I., Sukhova, L. L., & Sotnikova-Meleshkina, Zh. V. (2020). Features of free radical oxidation and antioxidant protection in adolescent boys with hypoandrogenism depending on the functional condition of the thyroid gland. *Problems of Endocrine Pathology*, 1, 30-35. doi: 10.21856/j-PEP.2020.1.04
- [17] Kumar, A., Shekhar, S., & Dhole, B. (2014) Thyroid and male reproduction. *Indian J. Endocrinol. Metab.*, 18(1), 23-31. doi: 10.4103/2230-8210.126523
- [18] Martin, A., Saunders, D. H., Shenkin, S. D., & Sproule, J. (2014). Lifestyle intervention for improving school achievement in overweight or obese children and adolescents. *Cochrane Database Syst Rev.*, 14(3), CD009728. doi: 10.1002/14651858.CD009728.pub2
- [19] Morgan, I. G., French, A. N., Ashby, R. S., Guo, X., Ding, X., He, M., & Rose, K. A. (2018). The epidemics of myopia: Aetiology and prevention. *Prog. Retin. Eye Res.*, 62, 134-149. doi: 10.1016/j.preteyeres.2017.09.004
- [20] P?rssinen, O., & Kauppinen, M. (2016). Associations of reading posture, gaze angle and reading distance with myopia and myopic progression. *Acta Ophthalmol.*, 94(8), 775-779. doi: 10.1111/aos.13148
- [21] Polka, N. S., & Gozak, S. V. (2018). *Mental capacity, educational load and way of life of modern schoolchildren: hygienic aspects: monograph*. Kyiv: NAMN of Ukraine, State Institution "Institute of Public Health named after OM Marzeev": Medinform.
- [22] Ponomarova, L. I., & Kindruk, M. O. (2018). *Health of schoolchildren in the conditions of intensification of educational activity*. Current issues of public health and environmental safety of Ukraine (fourteenth Marzeyev readings). Conference materials. Kharkiv, 18, 155-157.
- [23] Redko, I., & Chakmazova, E. (2020). The role of the primary doctor in the early diagnosis of endocrine diseases in children. *Georgian Med. News*, 298, 57-61. <https://pubmed.ncbi.nlm.nih.gov/32141850/>
- [24] Remenyakina, E. I., Pavluchenko, I. I., Ohrenenko, O. S., & Panasenkov, Y. S. (2014). *Comparative analysis of pro-antioxidant protection in patients with thyroid dysfunction*. Modern Problems of Science and Education. Available from: <https://www.science-education.ru/ru/article/view?id=12596>
- [25] Singh, N. K., James, R. M., Yadav, A., Kumar, R., Asthana, S., & Labani, S. (2019). Prevalence of Myopia and Associated Risk Factors in Schoolchildren in North India. *Optom. Vis. Sci.*, 96(3), 200-205. doi: 10.1097/OPX.0000000000001344
- [26] Sripongwiwata, S., Bunterma, T., & Tangb, K. N. (2018) An investigation of learning stressors among secondary school students: A case study in northeast Thailand. *Kasetsart Journal of Social Sciences*, 39(2), 197-206 <https://doi.org/10.1016/j.kjss.2017.06.002>
- [27] Sotnikova-Meleshkina, Zh. V. (2020). Screening diagnostics of schoolchildren as a tool for determining the risk of non-communicable diseases in the educational group. *Problems of Uninterrupted Medical Training and Science*, 40(4), 55-60. <https://doi.org/10.31071/promediosvity2020.04.055>
- [28] Sotnikova-Meleshkina, Zh. V. (2020). Comparative characteristics of influence of risk factors on subjective assessment of schoolchildren's health. *International Medical Journal*, 26(4), 89-93. <https://doi.org/10.37436/2308-5274-2020-4-16>

- [29] Stroud, L. R, Foster, E., & Niaura, R. (2009) Stress response and the adolescent transition: Performance versus peer rejection stressors. *Development and Psychopathology*, 21, 47-68. <https://doi.org/10.1017/S0954579409000042>
- [30] Svetlova, O. D. (2015). Prognostication of morbid affection dynamics in the children: the first results. *Environment & Health*, 3, 61-63.
- [31] Wei, C., & Crowne, E. C. (2016). Recent advances in the understanding and management of delayed puberty. *Arch. Dis. Child.*, 101(5), 481-488. doi: 10.1136/archdischild-2014-307963
- [32] Wu, P.-C., Chen, C.-T., Lin, K.-K., Sun, C.-C., Kuo, C.-N., Huang, H.-M. ... Yang, Y.-H. (2018). Myopia Prevention and Outdoor Light Intensity in a School-Based Cluster Randomized Trial. *Ophthalmology*, 125(8), 1239-1250. doi: 10.1016/j.ophttha.2017.12.011

СТРУКТУРА ПАТОЛОГІЧНОЇ УРАЖЕНОСТІ ДІТЕЙ СЕРЕДНЬОГО ШКІЛЬНОГО ВІКУ

Сотнікова-Мелешкіна Ж.В.

Інтенсифікація навчального процесу є одним із чинників ризику збільшення розповсюдженості морфофункціональних відхилень, гострої та хронічної соматичної захворюваності, розладів психіки та поведінки, синдрому дезадаптації. Багатьма дослідниками встановлено негативну хронодинаміку стану здоров'я школярів та високий рівень захворюваності серед учнів середнього шкільного віку. Мета дослідження - порівняльний аналіз структури та динаміки патологічної ураженості дітей у період навчання у базовій школі. У дослідженні прийняли участь 266 учнів закладів загальної середньої освіти віком від 10 до 14 років. Стан здоров'я оцінювали за даними профілактичних медичних оглядів, проведених фахівцями ДУ "Інститут охорони здоров'я дітей та підлітків НАМН України" за наявності інформованої згоди батьків та згідно біоетичних норм Гельсінської декларації (у редакції 2013 р.). Статистичну обробку даних проведено за допомогою ліцензованого пакету SPSS Statistic v.20 з використанням критерію Стьюдента. Найвищий рівень патологічної ураженості був встановлений за хворобами ендокринної системи ($468,4 \pm 39,7\%$), органу зору та придаткового апарату ($322,8 \pm 37,2\%$), системи кровообігу ($310,1 \pm 36,8\%$) та дихання ($303,8 \pm 36,6\%$). Серед дівчат більш часто реєстрували ендокринну ($520,7 \pm 57,7\%$) та офтальмологічну патологію ($386,7 \pm 56,2\%$), а серед хлопців - розлади психіки та поведінки ($168,7 \pm 39,9\%$; $p < 0,05$). Протягом навчання визначена негативна динаміка щодо хвороб ендокринної системи (за рахунок вірогідного збільшення їх кількості серед хлопців, при $p < 0,05$), хвороб органів травлення, ока та придаткового апарату за рахунок зниження гостроти зору ($p < 0,01$). У структурі ендокринної патології 60% становили захворювання щитоподібної залози в обох статевих групах, а рівень розповсюдженості ожиріння 1 ступеня був вищим серед хлопців ($p < 0,05$). Розлади психіки та поведінки були представлені переважно порушеннями активності та уваги у хлопців-підлітків, розладами сну - у дівчат; гіперкінетичними розладами поведінки - в обох статевих групах. Встановлені статеві особливості у структурі та динаміці патологічної ураженості учнів середнього шкільного віку у більшому ступені за хворобами ендокринної системи, ока та придаткового апарату із загальною негативною тенденцією до зростання поширеності цих груп захворювань.

Ключові слова: патологічна ураженість, структура захворювань, учні, середній шкільний вік, хлопці-підлітки, дівчата.