

Statement

From

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regarding

Dissertation work of Dr. Slavyana Dimitrova Malcheva-Marinova,
for awarding the educational and scientific degree "Doctor" in the scientific specialty
"Ophthalmology", code 03.01.36

Topic of the dissertation work:

"Ophthalmological Perspectives on Children's Eye Health"

Brief Biographical Data

In 2005, Dr. Malcheva-Marinova completed her secondary education at the Nikola Yonkov Vaptsarov Foreign Language High School in Shumen. In 2011, she obtained a Master's degree in Medicine from the Medical University "Prof. Dr. Paraskev Stoyanov", Varna. From 2012 to 2016, she specialized in ophthalmology at the same university.

Regarding her professional experience, from September 3, 2012, to January 1, 2013, she worked as a resident in ophthalmology at SOBAL "Dr. Taskov" Ltd., Targovishte. In parallel, from 2012 to 2019, she held a position as a doctor in optical centers in Varna, including "Kam 2004" Ltd. and "Mega Optic" Ltd., where she performed ophthalmological examinations and prescriptions. Between December 16, 2014, and March 16, 2015, she was a resident in ophthalmology at UMBAL "St. Marina" JSC, Varna. In the summer of 2019, she worked in an ophthalmological practice in Bottrop, Germany, performing diagnostics and treatment. From June 2020 to February 8, 2024, she was an ophthalmologist at DCC 1 Shumen EOOD, providing outpatient ophthalmological services. From February 2024 to the present, she works as an ophthalmologist at MCOB "Dr. Marinovi" Ltd. in Shumen, where she performs clinical practice in the field of ophthalmology.

Relevance of the Problem

Early diagnosis and timely treatment are crucial for preserving children's eye health. The awareness of health professionals, civil society, central and local authorities regarding the characteristics of the spread of eye diseases in childhood at the local level is of great importance for realizing the need for effective prophylaxis, tailored to the prevailing eye pathology in the respective population and reducing preventable visual impairments among children. The development and implementation of effective and regular screening programs at the regional level is a prerequisite for creating a positive perspective for preserving children's eye health and reducing the share of ophthalmological diseases in adulthood.

In different countries around the world, there is significant variability in the prevailing eye pathology among children, which can be a criterion for the level of development of healthcare and the economy in the respective region. In developing countries, infections and malnutrition are among the most common factors leading to vision loss in children, while in countries with high economic development, lesions of the optic nerve, retinal abnormalities, and hereditary eye diseases are leading. Refractive anomalies are a leading cause of reduced vision worldwide, both in children and adults.

The trend of increasing the frequency of myopia in childhood is alarming. Children with myopia who do not receive timely ophthalmological care are predisposed to developing learning and social difficulties, limited ability to practice certain types of sports, as well as other types of daily activities requiring good distance vision. It should not be overlooked that myopia can also be associated with other eye diseases.

Numerous scientific studies find a direct link between lifestyle and the development of myopia, with the main factor being the increased duration of time spent in front of a screen and limiting time spent outdoors. The COVID-19 pandemic and the accompanying anti-epidemic measures posed new challenges to children's vision. Digital learning entered widely into the educational system and established itself as a teaching method both under epidemic conditions and when in-person classes were suspended due to worsened meteorological conditions. Numerous negative effects of excessive screen time have been established, both on the psycho-social and physical development of children. The load on the visual system is particularly high, with children at risk of developing both temporary complaints – headache, accommodative disorders, and dry eye syndrome, as well as permanent consequences, such as the development of myopia and its progression.

The digitization of the world is a contemporary challenge to children's vision. What the ophthalmological perspectives of children's eye health will be in the modern, screen-saturated world depends on the timely and adequate therapeutic approach of health professionals, accessibility to preventive examinations, and last but not least, the awareness of teachers, parents, and the children themselves regarding the importance of timely prophylaxis and responsible care for vision in the family and school environment.

Structure of the Scientific Work

The dissertation work contains 148 pages and is illustrated with 39 figures and 23 tables. 255 literary sources are cited, of which 14 are in Cyrillic and 241 in Latin. The dissertation includes the following sections: Introduction; Objectives and tasks of the study; Methods; Results; Discussion; Conclusions; Summary; Contributions of the dissertation work; Scientific publications related to the dissertation work.

Literature Review

Objective:

Creating an epidemiological picture of childhood eye morbidity in the city of Shumen, tracking the factors modulating its characteristics, and formulating recommendations for ensuring positive perspectives for children's eye health, based on the obtained results.

Tasks:

1. Collecting medical information from ophthalmological examinations of children (0-17 years incl.) from three medical institutions – DCC1 Shumen EOOD, MC MBAL Shumen EOOD, and ASMP on OB "Dr. Ralitsa Emilova Neykova-Marinova" EOOD for the period 01.01.2019 – 31.12.2022;
2. Statistical analysis of the distribution of ophthalmological pathology in childhood on the territory of the city of Shumen for each year of the study period and overall for the entire study period;
3. Tracking the dynamics in childhood eye morbidity in the period before, during, and after the COVID-19 pandemic;
4. Comparing the obtained results with data from studies on the distribution of childhood eye pathology from foreign and local literary sources;
5. Formulating recommendations for optimizing ophthalmological screening in childhood;

Materials and Methods

The study is retrospective and is based on information from primary outpatient ophthalmological examinations of children (0-17 years), for the period 01.01.2019-31.12.2022, conducted by a total of 6 specialists in Eye Diseases, on the territory of DCC1 Shumen EOOD, MC MBAL Shumen EOOD, and ASMP on OB "Dr. Ralitsa Emilova Neykova-Marinova".

From the outpatient records, the following information was extracted – date of the examination, age and gender of the patient, leading diagnosis, according to the International Classification of Diseases (ICD-10). The study used information from primary outpatient examinations, without allowing duplication of diagnoses from secondary examinations of the same patient.

In the subsequent data processing, to facilitate the statistical analysis of the obtained information, the leading diagnoses were combined and classified into groups.

The information from the different medical centers was combined and structured into a common database in Excel, after which it was subjected to statistical analysis. The non-parametric Pearson test /criterion/ was applied for hypothesis testing, which is based on comparing actual frequencies and theoretical frequencies. The statistical processing of the data includes descriptive analysis, independent t-test (at significance level $p \leq 0.05$), variance analysis (with Student's t-criterion at statistical significance level $p \leq 0.05$), ANOVA (at significance level $p \leq 0.05$). The software product SPSS, version 19.0., Windows 11, Excel-2020 was used.

Own Studies. Results. Discussion.

From January 1, 2019, to December 31, 2022, a total of 2,579 primary ophthalmological examinations were registered for children aged 0 to 17 years in the territory of DCC1 Shumen EOOD, MC MBAL Shumen EOOD, and ASMP under OB "Dr. Ralitsa Emilova Neykova-Marinova" EOOD. The distribution by year is as follows: 697 individuals in 2019, 679 in 2020, 581 in 2021, and 622 in 2022. The average age for each year during the observed period was 10 years. Overall, 1,310 children were female and 1,269 were male. By age groups: 1,082 in the 12-17 years group, 1,070 in the 6-11 years group, and 427 in the 0-5 years group.

The registered primary diagnoses from the primary ophthalmological examinations in the studied population were classified into the following groups:

- Infectious inflammations of the conjunctiva: Mucopurulent conjunctivitis, Other acute conjunctivitis, Keratoconjunctivitis caused by adenovirus, Neonatal conjunctivitis and dacryocystitis.
- Inflammatory diseases of the eyelids: Blepharitis, Blepharoconjunctivitis, Hordeolum and other deep inflammations of the eyelid.
- Inflammatory diseases of the cornea, sclera, and uvea: Episcleritis, Iridocyclitis, Keratitis (including "Keratitis and keratoconjunctivitis due to herpes simplex virus" and "Other forms of keratitis").
- Allergic ocular diseases: Acute atopic conjunctivitis, Non-infectious dermatoses of the eyelid (allergic/contact dermatitis, eczematous dermatitis, xeroderma of the eyelids, and dermatitis in lupus erythematosus).
- Refractive anomalies: Hypermetropia, Astigmatism, Myopia.
- Strabismus: Divergent concomitant strabismus, Convergent concomitant strabismus, Unspecified strabismus.
- Tumor ocular diseases: Other conjunctival vascular diseases and cysts, Malignant neoplasm of the retina, Hemangioma of the eyelid.
- Accommodative disorders, headache, asthenopia: Headache, Subjective visual disturbances, Accommodative disorders.
- Traumatic injuries: Other superficial injuries of the eyelid and periocular area, Contusion of the eyelid/periocular area/eyeball, Open wound of the eyelid and periocular area, Thermal/chemical burn of the cornea/conjunctival sac, Trauma to the conjunctiva/cornea without mention of foreign body.
- Other: Amblyopia, Anomalies of color vision, Optic nerve atrophy, Congenital glaucoma, Congenital cataract, Iris coloboma, Conjunctival hemorrhage, Preretinopathy, Congenital ptosis, Retrobulbar neuritis, Stenosis and insufficiency of the lacrimal passages.
- Preventive examination: Examination of the eyes and vision (prophylactic ophthalmological examinations without complaints or registered pathological deviations).

Refractive anomalies predominated significantly at 54.31%, followed by accommodative disorders, headache, and asthenopia (11.18%), and infectious inflammations of the conjunctiva (10.16%). By year: In 2019, refractive anomalies were 54.35%, infectious conjunctivitis – 12.88%. In 2020, refractive anomalies – 53.83%, accommodative disorders – 12.08%. In 2021, refractive anomalies – 55.08%, accommodative disorders – 13.25%. In 2022, refractive anomalies – 54.04%, accommodative disorders – 13.25%, infectious conjunctivitis – 7.91%, eyelid inflammations – 7.10%; no tumor diseases.

Within the infectious conjunctivitis group: Frequency declined from 12.88% (2019) to 7.91% (2022); mucopurulent conjunctivitis dominated (6.11% overall). Eyelid inflammations: 6.52-7.57%. Inflammations of the cornea/sclera/uvea: 1% (2019) to 0.17% (2021). Allergic: Allergic conjunctivitis predominated; increase in 2022. Refractive anomalies: Myopia increased, astigmatism – 16.82% (overall decline), hypermetropia – 16.43% (decline from 17.54% in 2019 to 14.68% in 2022). Tumors: Low frequency (0.16% for conjunctival vascular diseases); none in 2022. Strabismus: Decline from 2.9% (2019) to 1.94% (2022). Traumas: 4.18% (2019) and 4.52% (2022), lower in 2020-2021. Accommodative: Accommodative disorders predominated (6.62% subjective disturbances, 0.86% headache); low in 2019

(2.32%). Other: Low frequencies for amblyopia, color vision anomalies, etc. Preventive: Decline from 3% (2019) to 1.72% (2021), increase to 3.39% (2022).

By gender and age: Infectious conjunctivitis – most common in 0-5 years (45.22%), least in 12-17 years (22.99%); more frequent in boys (54.8%). Eyelid inflammations: Similar in 0-5 and 6-11 years, less in 12-17 years. Sclera/uvea inflammations: Only over 6 years; keratitis – 57.15% in 12-17 years, more in boys. Allergic: Most common in 6-11 years (47.18%), equal by gender overall. Refractive: Increased with age (4.82% in 0-5 years, 51.94% in 12-17 years); in 0-5 years – hypermetropia (2.89%); in 6-11 years – hypermetropia (16.13%); in 12-17 years – myopia (23.66%), more in girls. Tumors: Most in 6-11 years (49.49%); specific cases by gender and age. Strabismus: Most in 0-5 years (54.89%), more in boys. Traumas: Most in 12-17 years, more in boys. Other: Amblyopia – most in 6-11 years, equal by gender; color vision anomalies – only in boys over 6 years; optic nerve atrophy – only in boys 12-17 years; congenital glaucoma – only in boys 0-5 years; congenital cataract – only in boys 6-11 years; iris coloboma – once in boy 12-17 years; conjunctival hemorrhage – over 5 years, more in boys; congenital ptosis – only in boys 0-5 and 6-11 years; preretinopathy – only in 0-5 years, equal by gender; retrobulbar neuritis – once in girl 12-17 years; lacrimal passage stenosis – only in 0-5 years, more in boys. Preventive: Decreased with age, most in 0-5 years, more in girls in 6-11 and 12-17 years.

By age and year: In 0-5 years – inflammations and traumas predominated; under 1 year – lacrimal passage stenosis, mucopurulent conjunctivitis; at 1 year – mucopurulent conjunctivitis; at 2 years – conjunctivitis; at 3 years – conjunctivitis, eyelid inflammations, hypermetropia; at 4 years – eyelid inflammations; at 5 years – astigmatism, accommodative disorders. In 6-11 years – refractive anomalies predominated; at 6 years – astigmatism, hypermetropia, atopic conjunctivitis; at 7 years – increase in refractive; at 8 years – hypermetropia, myopia; at 9 years – astigmatism; at 10 years – myopia, hypermetropia; at 11 years – no significant changes.

Comparisons: Congenital cataract – 0.08% (two cases in 6-11 years, male); in China – 13.6% (specialized hospital). Iris coloboma – 0.04% (once, 17 years, male). Congenital ptosis – 0.08% (two cases, 0 and 8 years, male); in China – 9%. Conjunctival hemorrhage – 0.19% (over 5 years). Preretinopathy – 0.08% (two cases, 0 years). Retrobulbar neuritis – 0.04% (once, 14 years, female). Lacrimal passage stenosis – 0.82% (under 1-1 year); in India – 5.2%. Keratitis – 0.29-0.48%, only 12-17 years, more in boys; in USA – average age 15 years, more in girls. Episcleritis – 0.12% (three cases, over 12 years, more in boys). Iridocyclitis – 0.12% (three cases in 2019, 6-11 and 12-17 years). Tumors – 0.16-0.34%, none in 2022; sporadic.

The study covers ambulatory examinations with low preventive percentage; misses part of the pathology. A national program for pediatric ocular screening is recommended, focused on refractive anomalies, strabismus, and amblyopia. Key elements: Team (medical staff or trained volunteers), age-appropriate tests (visual acuity with charts/projectors, motility, Hirschberg), anamnesis for asthenopia over 6 years. For under 6 months-1 year – by physician/nurse, including without family history. Prevention: More outdoor activities, reduced screen time, education on visual hygiene.

Conclusions:

1. The results of the study are statistically significant and comparable to data from the world scientific literature.

2. The characteristics of childhood eye morbidity on the territory of the city of Shumen approach those registered in other cities in Bulgaria, as well as those from other European countries, but have their individual peculiarities, with the most prominent being the high frequency of accommodative disorders and asthenopia.
3. The coronavirus pandemic and anti-epidemic measures are associated with both an increase in the frequency of myopia and an increase in accommodative disorders and asthenopic complaints in the pediatric population in the city of Shumen.
4. The decrease in the frequency of infectious conjunctivitis in childhood during the period 2020-2021 can be viewed as a positive side of the measures introduced to limit the spread of COVID-19.
5. It is necessary to organize an annual program for the prophylaxis of children's eye health at the national level, which should be comprehensive, accessible, and tailored to the characteristics of childhood eye morbidity in the study area.
6. There are numerous methods for limiting the main environmental factors increasing the risk of developing myopia in childhood, which are easily applicable, non-invasive, financially non-burdening, and would significantly reduce the risks for children's eye health in the modern digitized world.

Contributions:

1. Contributions of a cognitive nature

- a. An in-depth literature review was conducted on the characteristics and prevalence of ophthalmological pathology in childhood, both worldwide and in different parts of Bulgaria.
- b. An in-depth literature review was conducted on the influence of the COVID-19 pandemic on children's eye health.

2. Contributions of a scientific-applied nature

- c. A statistical analysis was conducted on the distribution of ophthalmological diseases in childhood for the period 2019-2022 on the territory of the city of Shumen.
- d. The dynamics in childhood eye morbidity in the period before, during, and after the COVID-19 pandemic were tracked.
- e. Recommendations for improving programs for eye screening in childhood were formulated.

3. Contributions of a confirmatory nature

- f. The influence of the coronavirus pandemic on children's eye health was proven - increase in the frequency of myopia, increase in cases of accommodative disorders and asthenopic complaints, and decrease in the frequency of infectious conjunctivitis in childhood.

2. Publications related to the dissertation work:

- a. Screens – a modern challenge to children's eye health
3. Visual displays – a modern challenge for children's eye health – GP NEWS, issue 6, 2023
 - a. Myopia in childhood and the COVID-19 pandemic – around the world and in our country

4. Childhood myopia and COVID-19 pandemic – around the world and in our country –
GP NEWS, issue 6, 2024

Statement

The dissertation work of Dr. Malcheva-Marinova examines a relevant topic related to the epidemiological characteristics of childhood eye morbidity in the Shumen region, emphasizing the influence of digitization and the COVID-19 pandemic on the vision of adolescents. This study highlights the need for timely prophylaxis and screening to reduce preventable disorders and ensure positive perspectives for eye health in childhood. The work of Dr. Malcheva-Marinova provides a current view of the problem by ensuring valuable data that can serve as a basis for improving children's eye health in Northeastern Bulgaria. The work is distinguished by precision in expression, well-defined objectives and tasks, as well as clear illustration of the results. The derived contributions of a scientific-applied nature, touching on the epidemiological and clinical characteristics of the condition, are of interest. Last but not least, the formulated recommendations for screening can help for adequate prevention. I believe that the work of Dr. Malcheva-Marinova can contribute to the improvement of methods for prophylaxis, prevention, and management of children's eye health. The volume of the dissertation, the relevance of the problem, as well as the in-depth analysis give me grounds to propose to the Scientific Jury to vote positively for awarding Dr. Slavyana Dimitrova Malcheva-Marinova the scientific degree "DOCTOR".

Varna
06.08.2025

Assoc. Prof. Dr. Mladena Radeva, PhD, FEBO

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