ANNOTATION
of the dissertation work Kabylbekova Aliya Kairatovna on the topic:
«Comprehensive optimization of measures to provide medical care for children with congenital cataracts»
submitted for the degree of Doctor of Philosophy (PhD)
in the specialty 8D10139 - «Public Health»

Relevance of the research topic:

The World Health Organization (WHO) estimates that there are more than 14 million blind children in the world (Solebo, Teoh, and Rahi 2017; Self et al. 2020; Tariq et al. 2022) . Childhood blindness negatively affects physical development, which in turn affects the quality of life of children and their families, as well as an economic burden on society (De Lima, Kugelberg, and Jirwe 2020; Gyllen, Magnusson, and Forsberg 2020) .

As part of the WHO initiative to eliminate preventable blindness, Program «Vision 2020: The Right to Sight» was implemented, with the fight against congenital cataract (CC) as one of the leading causes of childhood (Gilbert and Foster 2001). According to various researchers, this pathology occupies a significant place in the structure of visual disability - from 10.0% to 19.5%. Aubakirova A.Zh. (1996) found that one of the main socially significant congenital pathologies leading to blindness and low vision in the Republic of Kazakhstan was congenital cataract.

Congenital cataract is a pathological modification of the eye lens, expressed in its clouding, which is detected both in a newborn child and at a later age. The global prevalence of congenital cataract is estimated to be between 2.2/10,000 and 13.6/10,000 cases in children, with the highest rates in Asia and an upward trend since 2000 (Wu et al. 2016; Sheeladevi et al. 2016; Tariq et al. 2022). A better understanding of prevalence and other epidemiological characteristics allows the development of effective strategies for the prevention, early detection, treatment and rehabilitation of children with congenital cataracts, as well as the implementation of public health programs (Wu et al. 2016; Sheeladevi et al. 2016). The etiology of congenital cataract has many unknown causes, making primary prevention difficult.

Untimely surgical treatment of congenital cataracts, uncorrected aphakia, and failure to perform pleoptic treatment after surgery contribute to the formation of severe irreversible visual impairment in pediatric patients (Mohammadpour et al. 2019; Self et al. 2020; Bremond-Gignac et al. 2020) .

Despite innovative technologies, visual outcomes of congenital cataract extraction often do not correspond to the achieved anatomical results and depend on a number of reasons, among which age at the time of surgery is a key modifiable factor (Solebo, Cumberland, and Rahi 2018; Lambert et al. 2020; Bothun et al . 2021) .

Early detection of affected children is crucial in a favorable prognosis for the treatment and rehabilitation of congenital cataracts, since a delay in the provision of surgical care leads to irreversible blindness due to deprivation amblyopia (Li et al. 2017). Early diagnosis and treatment significantly increases the likelihood of a favorable outcome for the vision and psychophysical development of the child.

Screening for the red fundus reflex is a simple and effective tool for the early diagnosis of congenital cataracts. The sensitivity of this method is 99.6% (95% CI 97.1%-100%) (Sun et al. 2016) . However, in the Republic of Kazakhstan, this test is not included in neonatal screening, which probably negatively affects the results of surgical treatment and rehabilitation of children with congenital cataracts. By itself, congenital cataract surgery is of limited value unless regular post-operative follow-up is performed to promptly correct for changes in refractive errors as the child grows and to treat associated amblyopia (Repka 2016). Integrating eye care into primary health care is an effective way to improve eye care systems (Blanchet, Gilbert, and De Savigny 2014; Petrov, Kozlova, and Poleva 2019; Bantsykina et al. 2018) .

To date, the Republic of Kazakhstan has not developed an algorithm for the diagnosis, treatment and rehabilitation of children with congenital cataracts. These problems determine the relevance of the chosen topic, its theoretical and practical significance at the present stage of healthcare development.

The purpose of the dissertation research:

To optimize measures for the management of patients with congenital cataracts based on studying epidemiological and clinical characteristics.

Research objectives:

1. To study the existing main directions of organizing ophthalmological care for children with congenital cataracts;
2. To analyze the epidemiological and clinical characteristics of congenital cataracts among the child population in the Republic of Kazakhstan;
3. To assess the availability of ophthalmologists in the Republic of Kazakhstan, their awareness of the tactics of managing patients with congenital cataracts, and also to study the satisfaction of parents of children with congenital cataracts with the organization of ophthalmological care.
4. To develop an algorithm for organizational measures to provide medical care to children with congenital cataracts.

Research methods: bibliographic, information-analytical, statistical, sociological.

Objects of study: statistical data, medical records of an inpatient, pediatric ophthalmologists, parents of children with congenital cataracts.

Subject of study: epidemiological characteristics of congenital cataract in the Republic of Kazakhstan, awareness of pediatric ophthalmologists in the management of patients with congenital cataract, risk factors for congenital cataract, satisfaction with the quality of medical care for congenital cataract.

Scientific novelty of the study:

1. For the first time, based on the results of the study, the main problems in providing medical care to children with congenital cataracts have been formulated;
2. An organizational framework for effective screening of full-term newborns is provided;
3. The epidemiological and clinical features of congenital cataracts for 2011-2020 have been established. among the child population of the Republic of Kazakhstan.

Theoretical significance:

Systematized data on the clinical and epidemiological characteristics of congenital cataract in the Republic of Kazakhstan can serve as a basis for organizing subsequent in-depth scientific research;

The results of the study can be used in the process of training at advanced training courses for doctors and nursing professionals.

Practical significance:

Based on the developed questionnaires for pediatric ophthalmologists and parents of patients with congenital cataracts, as well as the analysis of regulatory documents, the most significant problems in the organization of medical care were identified.

An algorithm of organizational measures designed for use in practical healthcare has been developed.

The results of the study were introduced into clinical practice by the State Enterprise on the REM "City Polyclinic No. 15" of the Almaty City Healthcare Department, the State Enterprise on the REM "City Center for Human Reproduction" of the City Healthcare Center of Almaty, the State Enterprise on the REM "Karasai multidisciplinary inter-district hospital" of the Healthcare Center of Almaty region, private medical center "DAMED-2020".

The main provisions of the work submitted for defense:

1. Highly specialized ophthalmological care for congenital cataracts is provided at a later stage, as evidenced by the analysis of the epidemiological and clinical characteristics of this pathology.

2. In the Republic of Kazakhstan, there is an increase in the prevalence of congenital cataracts among the child population;

3. The main problems affecting the effectiveness of medical care for congenital cataracts are late presentation for surgical treatment, uneven staffing, lack of a clinical protocol for diagnosis and treatment, and insufficient coverage of rehabilitation measures after surgery.

Personal contribution of a doctoral student:

The doctoral student independently summarized and analyzed the data of domestic and foreign literature on the problem under study. The dissertator conducted a copying of data from the case histories of children with congenital cataracts, as well as a survey of pediatric ophthalmologists and parents of children with congenital cataracts. The author personally carried out the development of the design of the study, carried out analysis, generalization and statistical processing of data, prepared materials for publication and material for practical implementation.

Conclusions of the study:

1. The main directions of organizing medical care for congenital cataracts are early diagnosis (prenatal ultrasound diagnostics, screening of newborns for the red reflex from the fundus), early surgical treatment, mandatory long-term rehabilitation to achieve the best functional results;

2. Epidemiological characteristics of congenital cataracts in the Republic of Kazakhstan: an increase in the prevalence of the pathology under study from 8.7 to 11.7 per 100 thousand children in the Republic of Kazakhstan for the period 2015-

2019; morbidity according to visits to Kazakh Eye Research Institute for 2011-2020. - 1.2 per 100 thousand children. The median age at discovery of congenital cataract was 12.0 months (Q1 = 3.00; Q3 = 48.00), and the median age at surgery was 52.0 months (Q1 = 20.00; Q3 = 92.00). It was found that surgical care was provided to only 1.7% of patients under 6 months of age. Clinical features of congenital cataracts in the Republic of Kazakhstan: predominance of the bilateral form - 69.2%, diffuse cataracts - 43.6%, concomitant amblyopia of varying severity (84.3%), significant frequency of strabismus (30.1%) and nystagmus (18. 2%).

3. It was established that during the studied period (2015-2020), the national average indicator of the provision of ophthalmologists was 0.8 per 10 thousand population; significant fluctuations were observed across regions. A survey of pediatric ophthalmologists revealed the lack of uniform evidence-based approaches to patient management. According to a survey of parents of children with congenital cataracts, satisfaction with ophthalmological care provided at the tertiary level was higher compared to the primary level (95.3% versus 51.8%, $p < 0.001$).

4. Based on the results obtained, an algorithm for organizational measures to provide medical care to children with congenital cataracts has been developed. The main emphasis in the developed algorithm is early diagnosis, early surgical intervention if indicated, as well as mandatory postoperative rehabilitation measures, consisting of optical correction, treatment of amblyopia and control of complications.

Approbation of research results:

The main results of the dissertation research were reported and discussed at: 1. International scientific and practical conference "Challenges for public health and healthcare in a pandemic" (Almaty, February 11, 2021); 2. Republican scientific and practical conference of young scientists with international participation "Science and Health", dedicated to the 30th anniversary of the Independence of the Republic of Kazakhstan (Semey, November 19, 2021); 3. International Scientific and Practical Conference "Young Researcher: Challenges and Prospects for the Development of Modern Pediatrics and Pediatric Surgery", dedicated to the memory of a pediatric surgeon, Doctor of Medical Sciences Akhparov N.N. (Almaty, April 22, 2022); 4. Scientific and practical conference with international participation "Actual issues of pediatric ophthalmology" (Astana, September 30 - October 1, 2022); 5. 17th World Congress on Public Health (Rome , Italy, May 3-6 , 2023) .

Published papers on the topic of the thesis:

9 scientific papers were published on the topic of the dissertation, including 3 in publications recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, 2 articles in scientific journals indexed in the Scopus database (CiteScore 2022 - 4 .1, percentile 75‰ and CiteScore 2022 – 3.3, percentile 65‰), 4 scientific papers have been published in collections and materials of international scientific and practical conferences. Received 2 copyright certificates, 4 acts of implementation.

Implementation of research results:

Acts of implementation in practical health care were received based on the results of research work: “Practical recommendations for improving the organization of medical care for congenital cataracts” in private medical center “Damed clinic”; “Algorithm of organizational measures for the provision of medical care for congenital cataracts” in the State Enterprise on the REM “City Polyclinic No. 15” of the Almaty City Healthcare Department; “Prenatal diagnosis of congenital cataract in the fetus during ultrasound screening in the II - III trimesters of pregnancy” in the State Enterprise on the REM “City Center for Human Reproduction”, “Early diagnosis of congenital cataract in full-term newborns” in the State Enterprise on the REM “Karasai multidisciplinary inter-district hospital”.

Copyright certificates:

1. Author’s certificate No. 24100 “Questionnaire for the study of risk factors for congenital cataracts, as well as the assessment of satisfaction with the quality of medical care among parents of children with congenital cataracts” 2022.

2. Author’s certificate No. 24900 “Questionnaire for assessing the main aspects of medical care for congenital cataracts” 2022.

The scope and structure of the dissertation:

The dissertation work is done in accordance with the established rules, and consists of an introduction, literature review, research materials and methods, results of own research, a list of references from 167 sources. The dissertation is presented on 162 pages of computer text, designed in compliance with the required standards, contains 75 tables and 58 figures.