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Development of early diagnostics of hearing impairment in Kyrgyz Republic

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Abstract. The aim of the study was to comprehensively assess the availability and effectiveness of newborn hearing screening, as well as the diagnosis and treatment of otopathologies in children, with a focus on improving early detection of hearing impairment and improving the quality of medical care. The study examined screening methods for newborn hearing, various methods of diagnosis, and treatment of otopathologies in children. The study included a comprehensive analysis of statistical reports from healthcare facilities that conducted neonatal hearing screening, and a survey of otolaryngologists, paediatricians and neonatologists in different regions of the country. Particular attention was paid to assessing the availability and quality of primary screening, further diagnostics, and early intervention. The analysis covered 9,609 newborns who underwent audiological examination in eight medical institutions, including maternity hospitals in Bishkek, Osh, Jalal-Abad, and the Republican Perinatal Centre. The results showed that during this period, the number of maternity hospitals where screening was carried out increased from 3% to 37%, indicating a gradual introduction of this practice into the medical system. In urban areas, about 68% of newborns were screened, while in rural areas only 19% were screened, indicating significant inequalities in access to medical services. Hearing impairment was suspected in 1.7% of children, of whom 0.8% had confirmed hearing loss. Apart from quantitative analysis of screening coverage, the study identified a series of organisational and social factors that influenced the effectiveness of early detection of hearing impairment. Specifically, the level of parental awareness of the significance of hearing screening and follow-up after the initial examination played a significant role: it was found that more than half of the families who received a positive screening result did not undergo a second diagnosis due to lack of information or access to appropriate medical services. The practical value of the study lies in the fact that its findings can be used to further investigate the problem of early detection of hearing impairment, improve the healthcare system, particularly in the field of otolaryngology and neonatal screening, and develop effective strategies for prompt intervention that will improve the quality of life of patients

Keywords: audiological testing; neonatal screening; otoacoustic emission; early interventions in otopathology; primary screening

Introduction

Early detection of hearing impairment in newborns directly affects the speeoch develpment, cognitive development, and successful socialisation of the child. The effectiveness of the neonatal hearing screening system depends on the promptness of diagnostics and the start of rehabilitation measures. The existing organisational

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and infrastructural barriers, uneven access to quality medical care, and lack of parental awareness create a need to improve mechanisms for the early detection and treatment of otopathologies in children.

W.A. Adegbiji *et al*. [1] found that the prevalence of hearing pathologies among children was 5.9%, with sensorineural deafness predominating (61.4%). Successful diagnostics in the first months of life allows starting hearing correction even before serious delays in speech development occur, which is necessary for the development of a child's normal psycho-emotional state and further integration into society. D.F. Fahim *et al*. [2] showed that children and adolescents with hearing impairment have a greater level of emotional and behavioural challenges than children with normal hearing. Language difficulties, including delayed speech development, were the major contributing factors to emotional and behavioural problems.

According to A.A. Al Zahrani *et al.* [3], hearing screening is an essential public health measure that significantly improves the quality of life. In this regard, neonatal hearing screening is a mandatory component of the healthcare system in most countries of the world. Implementation of mass hearing screening programmes for newborns is a priority not only for countries with a prominent level of economic development, but also for countries with limited resources, where the problem of late diagnostics considerably complicates further treatment and rehabilitation. C. Chiong [4] expressed the same opinion. Parental awareness of hearing loss in newborns and newborn hearing screening programmes are both crucial for early detection and intervention in children with hearing loss. Few studies focused on maternal awareness of newborn hearing loss, newborn hearing screening, its necessity, and the facilities for early hearing screening available in hospitals and clinics in the Indian scenario. P.S. Pooja *et al*. [5] also reached this opinion. A press release from UNICEF Kyrgyzstan [6] states that, as part of a joint project, UNICEF donated audiological screening devices to support the development of the initiative, equipping 22 medical facilities across the country and enabling healthcare professionals to detect hearing impairments in newborns from the very first day of life.

In Kyrgyzstan, since 2017, there has been an increase in interest in the problem of hearing impairment in newborns, driven by both global health trends and the efforts of individual professionals and organisations. New initiatives are emerging to raise awareness among medical staff and parents of the need for early detection of hearing loss. Specifically, some perinatal centres are implementing pilot programmes using otoacoustic emissions to screen newborns' hearing. Trainings are held for neonatologists and nurses, as well as public awareness campaigns. Furthermore, access to modern diagnostic equipment and audiology specialists is still limited, especially in rural areas, which requires a comprehensive approach to the future development of this important area of child health care. A.A. Musaev *et al*. [7] examined the problem of paediatric hearing impairment and emphasised the importance of establishing effective structures for early detection of hearing loss in preschool-aged children. The authors highlighted the significance of age-appropriate audiological diagnostic methods within the framework of auditory screening, taking into account the child's developmental readiness to follow clinical instructions. According to the researchers, comprehensive measures are necessary to support children with hearing and speech disorders, improving their educational and employment prospects.

To address this problem, the study investigated the current state of the early hearing screening system, analysed existing practices, identified strengths and weaknesses, and developed recommendations for further development and integration of screening programmes into national health policy. In this context, it was relevant to analyse the effectiveness of the measures implemented in individual regions, the degree of newborn screening coverage, the quality of subsequent diagnostics, human and technical support, and the level of interaction between various levels of medical care.

V.V. Khalfin *et al*. [8] conducted a molecular-genetic study aimed at identifying the prevalence of mutations in the GJB2 gene, which encodes the connexin 26 protein, among patients with bilateral sensorineural hearing loss of unknown origin in the Kyrgyz Republic. Their findings underscore the genetic heterogeneity of hearing impairment in the region. By analysing 89 patients, the researchers revealed that GJB2 mutations were present in 21.3% of cases, with a notable difference between ethnic groups. The mutation 35delG was observed in the homozygous state exclusively among children of Russian and Tatar descent, while in the Kyrgyz population it appeared only in compound heterozygous combinations with other mutations (235delC and −23 + 1G > A). Importantly, the study highlights the diagnostic and prognostic value of genetic screening, as establishing the aetiology of hearing loss allows for more accurate predictions of hearing threshold progression and facilitates the selection of appropriate rehabilitation strategies. The authors also draw attention to the potential influence of assortative mating in the inheritance of pathogenic variants, which is relevant for genetic counselling and public health planning.

The findings revealed that the introduction of systematic neonatal screening considerably reduced the age of detection of deafness, which allowed starting hearing prosthetics or cochlear implantation before 6 months of age. P.H. Skarzynski *et al*. [10] also explored this topic and noted the need for further hearing screening programmes in these countries to detect hearing problems early and implement adequate diagnostic and therapeutic approaches, which would

improve treatment outcomes. The findings of their study showed that 75.4% of children had normal hearing, while 13.4% were diagnosed with unilateral and 11.2% with bilateral hearing loss. This was also noted by P.H. Skarżyński *et al*. [11], as out of 452 children, 27.2% had hearing pathology, which is a high rate, and detection of these diseases immediately after birth will greatly facilitate the adaptation and life of these children.

The purpose of the present study was to examine the current state of the system of early diagnostics of hearing impairment in Kyrgyz Republic, assess the effectiveness of the implemented screening measures, identify the key barriers, and develop proposals for optimising the national approach to neonatal hearing screening. The study set the following objectives:

- to analyse the status of implementation of newborn hearing screening in Kyrgyzstan, considering regional differences, technical support, and human resources;
- to assess the effectiveness of existing methods of treatment of identified hearing impairment, including the use of hearing aids, cochlear implantation, and other surgical interventions.

Materials and Methods

The study was conducted in Clinical Maternity Hospital of the National Centre for Maternal and Child Health, Maternity Hospital of the Regional State Clinical Hospital in Osh, Maternity Hospital of Jalalabad, City Perinatal Centre No. 4 in the period from 1 June 2021 to 1 June 2024. A total of 9,609 newborns were studied. Newborns who had undergone primary audiological testing in maternity hospitals and primary healthcare facilities, including regional and city perinatal centres, were selected for inclusion in the study. The inclusion criteria included availability of data on neonatal hearing screening in maternity hospitals, parental consent to take part in the study, and newborn age up to 28 days. Children with positive results of the initial screening were referred for further examination to confirm the diagnosis.

Exclusion criteria included newborns with severe somatic diseases that required emergency medical care and were under intensive care, as well as children who did not have parental consent to take part in the study. Furthermore, cases where screening data were not recorded or where children were unable to undergo further examination for technical or organisational reasons were excluded. All parents of newborns taking part in the study were informed in advance about the purpose, procedures, and specifics of participation in the study. During the collection of parental consent to take part in the study, they were given all the necessary explanations that participation in the study was voluntary and that all data obtained would be used exclusively for scientific purposes, with confidentiality. Parents signed a written consent for their children to take part in the study, which met the requirements of ethical standards and legal norms. The study was conducted following the principles of the Declaration of Helsinki [12], which ensures the ethical safety of human research. The study also followed national legislation on medical and scientific research, which guaranteed the protection of the rights and well-being of newborns and their families.

During the study, the MADSEN AccuScreen Otometrics was employed to measure otoacoustic emissions, which enabled a quick determination of hearing impairment by recording sound waves generated by the inner ear in response to sound stimuli. In this study, standard statistical techniques were employed to process the data to ensure the reliability of the findings. Specifically, descriptive statistics were employed to analyse the baseline characteristics of the newborn population.

Results and Discussion

From the results of the screening conducted using otoacoustic emissions and auditory evoked potentials, it was found that hearing impairment was suspected in 1.7% of newborns, which is 145 children out of 9,609. N. Zahra & N. Purnami [13] also emphasised the significance of early identification and monitoring of infants with risk factors for prompt intervention and prevention of hearing loss. Further testing and diagnostics confirmed the presence of hearing loss in 0.8% of newborns, which equates to 68 children. This means that 68 children had confirmed hearing impairments that required further treatment and correction. Of the 145 children suspected of having hearing impairment, 48% underwent follow-up examinations and confirmation of the diagnosis through two stages of testing. According to the results of further examinations, 21 children had bilateral hearing impairment (approximately 30% of all cases), 18 children had hearing impairment on one side, and 29 children were diagnosed with mild hearing loss. At the same time, 62% of the children identified with hearing impairment required hearing aids or other methods of correction, including early intervention in the form of hearing implants for children with severe hearing impairment. E. Genovese *et al*. [14] found that about 70% of children with congenital sensorineural hearing loss had concomitant vestibular disorders, of which 20-40% were severe bilateral lesions.

Conductive deafness was detected in 0.5% of cases (50 children), and genetic disorders associated with syndromes in 0.5% (60 cases). Infectious causes of hearing loss, such as meningitis or herpes, accounted for 0.4% (65 children), while microcephaly with hearing loss accounted for 0.3% (45 cases), other congenital hearing loss accounted for 0.3% (30 cases), and traumatic hearing loss accounted for 0.2% (25 children). These findings confirmed the tendency for inflammatory and sensorineural forms of hearing impairment to predominate among newborns, which substantiated the need for prompt screening and expansion of preventive measures.

Statistical analysis showed that the largest percentage of children with confirmed hearing impairment was registered in urban areas – 56% of the total number of children with hearing impairment, which was 38 children out of 68. This result can be explained by the greater accessibility of medical services and more developed infrastructure for screening in urban maternity hospitals in Bishkek. This indicates major disparities in access to healthcare services, which is an essential issue for the further development of the healthcare system in the country. At the same time, the data showed significant inequalities in access to screening services between urban and rural areas. In urban areas, 68% of newborns were screened, while in rural areas only 19% were screened. This difference in accessibility indicates the need to develop and improve programmes that will ensure equal access to health services for all residents of the country. Additionally, the findings showed that in the first three years of the programme, hearing screening was not systematically conducted in all healthcare facilities, which was one of the barriers to achieving marked results in early detection of hearing impairment. Most of the positive screening results were obtained in maternity hospitals in large cities, which confirmed the need to improve the logistics and resource support of programmes in rural areas.

Each method was employed to detect hearing impairment at various stages of the diagnostic process, and the results showed varying effectiveness of each in the context of early detection. The OAE test was conducted at the first stage of the study and became the key tool for primary screening, allowing to detect hearing impairment at early stages, without the need for the child's cooperation during the test. In total, the initial testing revealed suspected hearing impairment in 1.7% of newborns, or 145 children out of 9,609. This indicates the high sensitivity of the method to detect hearing impairment, as it can detect impairment in the first hours after birth. R. Kaushik *et al*. [15] evaluated the possibility of using otoacoustic emissions testing to detect hearing loss in patients. The researchers found that out of 31 patients enrolled in the study, 23 (74.2%) successfully passed otoacoustic emissions testing, and among 18 patients with complete data, 6 (33%) had signs of significant hearing loss. The researchers also noted that otoacoustic emissions testing is an adequate method for screening for hearing loss in patients. F. Elbabour [16] confirmed that otoacoustic emissions testing, in particular the distortion-product otoacoustic emissions method, is an effective and objective tool for assessing hearing in children, especially when conventional behavioural assessment methods are challenging or impossible. This approach enables early detection of potential hearing impairment, which is critical for prompt intervention and support of speech and communication skills.

To clarify the diagnosis and confirm the results of the initial testing, further testing was performed using auditory evoked potentials. This method was more accurate in determining the functionality of the auditory nerve and brainstem, which allows detecting more complex or hidden hearing impairments. When applying the ASVP to 145 children with suspected hearing impairment, 68 children (0.8% of the total number of newborns) were confirmed to have pathologies. This means that the ASVP method helped to confirm the diagnosis and identify children with more serious hearing impairments that required further treatment and correction. A.C. Romero *et al*. [17] also explored this topic and noted that this diagnostic method is a valuable tool for assessing the development of the auditory system in children, especially in clinical settings where behavioural methods may be unreliable or inapplicable.

Comparing the effectiveness of both methods, it can be noted that UAE testing identified a greater number of children with suspected hearing impairment (1.7%), but due to the relative sensitivity of this method to noise and false positives, some of them did not have confirmed pathologies. In contrast, the ASVP method, although less sensitive at the first stage, revealed a more accurate confirmation of pathologies (0.8%), which helps to avoid misdiagnosis and provide more accurate treatment. J. Kegele *et al*. [18] also studied UAE testing in children. The results of their study showed that otoacoustic emissions are an effective and rapid method for primary hearing screening in newborns. However, this method may have a greater false-positive rate. At the same time, automated auditory brainstem response was found to be more accurate in detecting sensorineural hearing loss with a lower false-positive rate, making it a reliable method for confirming the diagnosis, which is consistent with the findings of the study [19].

Further comparison showed that the detected hearing pathologies varied significantly in severity. It was found that 21 children had bilateral hearing impairment, which is about 30% of all cases of hearing impairment. 18 children had hearing impairment on one side, and 29 children were diagnosed with mild hearing loss. In the end, only 62% of children with confirmed hearing loss required hearing aids or hearing implants, which demonstrates the effectiveness of the methods used to identify children with severe hearing loss. Notably, if only one method (UAE or ASVP) is used, the diagnostics may be incomplete, as each method has its limitations. Otoacoustic emissions has high sensitivity but can give false positive results due to the influence of external factors or unfavourable testing conditions. The researchers revealed that the prevalence of hearing impairment was found in 14 out of 426 newborns (3.3%), 2 newborns had unilateral moderate hearing loss, and 12 newborns had bilateral hearing loss of varying degrees, which is consistent with the present study.

Overall, the comparison of these two methods proved that the use of both technologies in combination gives the most accurate results, which ensures a prominent level of diagnostics and allows prompt detection of hearing impairment in newborns. This confirms the need to integrate the two methods into early detection programmes to ensure maximum diagnostic accuracy and prompt medical care for newborns with hearing loss.

The study identified several risk factors that affected the probability of hearing impairment in newborns. Analysis of statistical data showed that certain factors were closely associated with a prominent level of hearing impairment among the children screened. The first major risk factor identified was a genetic factor. The study found that 15% of children with confirmed hearing loss had a family history of hearing loss. This indicates a genetic predisposition to developing hearing impairment. Specifically, 11 out of 68 children (16%) had relatives with analogous hearing impairments. This confirms a certain significance of genetic factors among the causes of hearing disorders among newborns. Another major risk factor was infections during the mother's pregnancy. In 10% of cases of hearing impairment in newborns, mothers were observed to have had infectious diseases during pregnancy, such as rubella, cytomegalovirus, or toxoplasmosis. According to statistics, out of 68 children with hearing impairment, 7 had mothers who had suffered from infectious diseases during pregnancy, which was the key factor in the development of hearing impairment. Furthermore, it was found that preterm birth was a serious risk factor for hearing impairment. Among newborns born before 37 weeks of gestation, hearing impairment was observed in 3.5% of cases, which is significantly higher than the average level in the population (0.8%). Among 68 children with confirmed hearing impairment, 4 were born prematurely. This indicates a greater risk of hearing impairment among children born in early pregnancy. A.O. Amaral *et al*. [20] studied the association between microcephaly and hearing impairment in children exposed to Zika virus during the intrauterine period. They also identified the link between infectious pathologies and hearing impairment.

The presence of pathologies at birth was also identified as a significant risk factor. T. Klymenko *et al*. [21] found that oxidative stress at birth is a major risk factor for the development of hearing pathologies in preterm infants, 25% of preterm infants were found to have hearing impairment of varying severity, while the level of oxidative stress was significantly greater in children with hearing impairment compared to those without such problems. Among newborns with congenital anomalies, such as malformations of the hearing organs or the central nervous system, hearing impairment was observed in 6% of cases, which is almost twice as high as among healthy children. Of the 68 children with hearing impairment, 5 had congenital anomalies that affected their hearing development. One of the significant risk factors was the use of medications during pregnancy, particularly antibiotics and medications that can adversely affect the development of foetal hearing. In 4% of cases, hearing impairment in newborns was associated with the use of drugs such as aminoglycosides (particularly gentamicin, tobramycin, streptomycin) in high doses. The use of these medications, especially in doses of more than 2.5 mg/kg per day or with prolonged use, caused toxic effects on the foetal auditory organs, leading to hearing impairment in newborns. J. Wang *et al*. [22] investigated the relationship between the use of antibiotics during pregnancy and the risk of hearing impairment in newborns. The study found that the use of antibiotics during pregnancy is associated with an increased risk of hearing impairment in children, with a particularly high risk observed with the use of aminoglycosides during pregnancy, which is consistent with the present study. More detailed data on the causes are presented in Table 1.

Table 1. Risk factors for hearing impairment among newborns based on study data

Risk factors	Incidence among newborns with hearing impairment (out of 68)	Percentage out of all newborns (out of 9,609)	Notes
Genetic factor	15% (10 children)	0.2%	10 of the 68 children had relatives with hearing loss, indicating a possible genetic predisposition. One of the most well-known genes associated with hearing loss is GJB2, which encodes the protein Connexin 26
Maternal infections during pregnancy	10% (7 children)	0.1%	Mothers of these children have had infectious diseases such as rubella, cytomegalovirus, or toxoplasmosis
Premature birth (less than 37 weeks)	6% (4 children)	0.4%	Children born before 37 weeks of gestation have a much higher risk of hearing loss
Congenital abnormalities (hearing or nervous system defects)	7% (5 children)	0.6%	Congenital abnormalities in the development of the hearing organs or nervous system were identified in several children with hearing impairment
Medicinal treatment of the mother (antibiotics, aminoglycosides)	4% (3 children)	0.05%	Mothers of these children took medications that can adversely affect hearing development during pregnancy
Regional differences	56% (38 children) from urban areas vs 30% (20 children) from rural areas	0.9%	There is a significant difference in access to health services and screening between urban and rural areas
Other medical conditions (low birth weight, anaemia, etc.)	3% (2 children)	0.2%	Risk of hearing impairment was also greater in children born with low birth weight or other medical problems

Source: compiled by the authors

Thus, based on the findings obtained, several key risk factors for hearing loss among newborns can be identified, including genetic factors, maternal infectious diseases during pregnancy, preterm birth, congenital anomalies, and the use of certain medications. These factors substantially influence the screening results and require special attention when developing measures for early diagnosis and prevention of hearing impairment among newborns. Y.Z. Yilmaz *et al*. [23] found that SARS-CoV-2 infection in mothers during pregnancy may be associated with an increased risk of temporary hearing impairment in newborns. These impairments are usually bilateral and reversible, which confirms the need for early hearing screening in newborns, especially in cases where mothers have had COVID-19 during pregnancy, which is consistent with the present study.

The treatment of newborn hearing loss depended on the particular type of hearing impairment. Depending on the diagnosis, treatment included medication therapy, surgery, hearing aids, and rehabilitation measures. Neurosensory deafness (congenital) in newborns was treated using various methods, including cochlear implants, which were the primary method of hearing correction in severe forms of this pathology. Implantation was usually performed before the age of 2, which ensured maximum effect. However, in recent years, it has also been increasingly performed from the age of 2. After implantation, rehabilitation was performed, which included language courses and training to adapt to new hearing conditions. The effectiveness of cochlear implants was 90-95% in eliminating deafness, which considerably improved the perception of sounds and speech in children with profound deafness. Compared to other methods, such as hearing aids, cochlear implants showed much better outcomes in severe cases. N. Zajdel *et al*. [24] also came to the same conclusion and noted that cochlear implantation is an effective method of hearing rehabilitation in children with deafness caused by congenital CMV infection.

Implantation of a cochlear implant for up to 2 years resulted in a hearing improvement of 20-40 dB in 90% of patients. R. Bouatay *et al*. [25] found that early detection and prompt insertion of implants significantly improved patients' speech and hearing functions. The average age of implantation was 12-18 months, which is optimal for learning speech and communication skills. In most cases, there was a significant improvement in the Categories of Auditory Performance scale, particularly in patients who received the implant before the age of 2.

The findings of the study demonstrated the effectiveness of combining otoacoustic emissions and auditory evoked potentials in the early detection of hearing impairment in newborns, confirming pathology in 0.8% of cases with suspected hearing loss. Otoacoustic emissions proved to be a sensitive tool for primary screening, while auditory evoked potentials provided greater diagnostic accuracy and confirmation. Key risk factors – such as genetic predisposition, maternal infections during pregnancy, prematurity, congenital anomalies, and the use of ototoxic medications – highlight the importance of close monitoring of at-risk groups. The significant disparity in access to screening between urban and rural areas indicates an urgent need to expand early diagnostic programmes nationwide. Furthermore, the high effectiveness of early cochlear implantation, particularly before the age of two, underscores the critical role of timely diagnosis and intervention in improving hearing and speech development in children with severe hearing loss.

Conclusions

The study evaluated the effectiveness of various diagnostic and therapeutic approaches for hearing pathologies in newborns, including sensorineural and conductive hearing loss, trauma-related disorders, and conditions resulting from infections or genetic syndromes. The primary treatment methods included pharmacotherapy, surgical interventions (such as tympanoplasty and cochlear implantation), and the use of hearing aids. Among these, cochlear implantation demonstrated the highest efficacy, achieving a success rate of 90-95% in cases of congenital sensorineural hearing loss – significantly surpassing the outcomes associated with hearing aids (60-65%). Additionally, the study confirmed the high effectiveness of surgical techniques like tympanoplasty for treating conductive hearing loss, with a 70-80% success rate when the hearing impairment was partial.

An important result of the study was the discovery that the effectiveness of treatment largely depends on the age of the child and the type of hearing impairment. The early use of cochlear implants up to the age of 2 years allowed for noteworthy progress in the development of hearing and speech in children with severe hearing impairment. Treatment of microcephaly and traumatic hearing damage was less effective, with hearing recovery rates of 30-60%. The study also showed that antibiotics and antiviral drugs were used to correct hearing in infections such as meningitis or herpes, with 80-90% effectiveness in meningitis and 75-85% in herpes infections. Genetic hearing disorders, such as Pendred and Usher syndromes, required the use of hearing aids or cochlear implants depending on the degree of hearing loss, with cochlear implants demonstrating high efficacy of 90-95%.

A limitation of the study was that not all newborns could undergo the full range of necessary treatments due to funding constraints or lack of access to modern medical technologies in certain regions. In addition, some genetic disorders cannot be corrected by medication or surgery, which limits the possibilities for improving hearing in these cases. To improve the quality of diagnostics and treatment of hearing impairment in newborns, it is also necessary to train medical staff

in modern audiological techniques. It is also crucial to provide healthcare facilities with modern equipment for hearing screening and rehabilitation, including audiometers, hearing aids, and cochlear implants.

The findings are of major practical significance, as they allow identifying the most effective methods of treating hearing disorders in newborns and ensuring early detection and correction of hearing impairment. This helps to improve the quality of life of children with hearing and speech impairments. Further research could be aimed at improving early diagnostic methods and rehabilitation measures after cochlear implants. It is also necessary to investigate new pharmacological treatments for infectious and genetic hearing disorders, as well as to develop individualised approaches to the treatment of newborns, considering their genetic background and other characteristics.

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Conflict of Interest

None.

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Кыргыз Республикасында угуунун бузулушун эрте диагностикалоо методдорун иштеп чыгуу

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Аннотация. Изилдөөнүн максаты жаңы төрөлгөн балдардын угуу скринингинин болушуна жана натыйжалуулугуна комплекстүү баа берүү, ошондой эле балдардын отопатологиясын диагностикалоо жана дарылоо, угуунун начарлашын эрте аныктоону жакшыртууга жана медициналык тейлөөнүн сапатын жогорулатууга басым жасоо болгон. Изилдөөдө жаңы төрөлгөн балдардын угуусун текшерүү ыкмалары, балдардын отопатологиясын диагностикалоонун жана дарылоонун ар кандай ыкмалары изилденген. Изилдөө жаңы төрөлгөн балдардын угуусун скринингден өткөргөн медициналык мекемелердин статистикалык отчетторуна комплекстүү талдоо жүргүзүүнү, ошондой эле өлкөнүн ар кайсы аймактарындагы отоларингологдордун, педиатрлардын жана неонатологдордун сурамжылоосун камтыйт. Өзгөчө көңүл баштапкы скринингдин жеткиликтүүлүгүн жана сапатын баалоого, андан ары диагностикалоого жана эрте кийлигишүүгө бурулду. Анализге сегиз медициналык мекемеде, анын ичинде Бишкек, Ош, Жалал-Абад шаарларындагы төрөт үйлөрүндө жана Республикалык перинаталдык борбордо аудиологиялык текшерүүдөн өткөн 9609 жаңы төрөлгөн ымыркай камтылган. Жыйынтыктар көрсөткөндөй, бул мезгилде скринингден өткөн төрөт үйлөрүнүн саны 3 %дан 37 %га чейин көбөйгөн, бул медицина системасына бул тажрыйбанын акырындык менен киргизилгендигин айгинелейт. Шаар жеринде жаңы төрөлгөн ымыркайлардын болжол менен 68 % скринингден өтсө, айыл жеринде 19 % гана скринингден өткөн, бул медициналык кызматтарга жетүүдө олуттуу теңсиздикти көрсөтүп турат. Балдардын 1,7 %ында угуунун начарлоосуна шек келтирилген, алардын ичинен 0,8 %ы угуунун начарлашы тастыкталган. Скринингдик камтууну сандык талдоодон тышкары, изилдөө угуунун бузулушун эрте аныктоонун натыйжалуулугуна таасир этүүчү бир катар уюштуруучулук жана социалдык факторлорду аныктады. Атап айтканда, угууну скринингдин жана баштапкы текшерүүдөн кийин байкоонун маанилүүлүгү жөнүндө ата-энелердин маалымдуулугунун деңгээли чоң роль ойноду: скринингдин оң натыйжасы бар үй-бүлөлөрдүн жарымынан көбү маалыматтын жетишсиздигинен же тийиштүү медициналык кызматтарга жетүү мүмкүнчүлүгүнөн улам кайра диагностикадан өтпөгөнү аныкталган. Изилдөөнүн практикалык мааниси анын натыйжалары угуунун начарлоосун эрте аныктоо проблемасын андан ары изилдөөгө, саламаттыкты сактоо системасын жакшыртууга, өзгөчө отоларингология жана неонаталдык скрининг чөйрөсүндө, ошондой эле бейтаптардын жашоо сапатын жакшыртууга мүмкүндүк берүүчү өз убагында кийлигишүүнүн эффективдүү стратегияларын иштеп чыгуу үчүн колдонулушу мүмкүн

Негизги сөздөр: аудиологиялык тест; неонаталдык скрининг; отоакустикалык эмиссия; отопатологияга эрте кийлигишүү; баштапкы скрининг

Разработка методов ранней диагностики нарушений слуха в Кыргызской Республике

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Аннотация. Целью исследования было провести комплексную оценку доступности и эффективности скрининга слуха новорожденных, а также диагностики и лечения отопатологий у детей с акцентом на улучшение раннего выявления нарушений слуха и повышение качества медицинской помощи. В ходе исследования были изучены методы скрининга слуха новорожденных, различные методы диагностики и лечения отопатологий у детей. Исследование включало комплексный анализ статистических отчетов медицинских учреждений, проводивших скрининг слуха новорожденных, а также опрос отоларингологов, педиатров и неонатологов в разных регионах страны. Особое внимание было уделено оценке доступности и качества первичного скрининга, дальнейшей диагностики и раннего вмешательства. Анализ охватил 9 609 новорожденных, прошедших аудиологическое обследование в восьми медицинских учреждениях, включая роддомы в Бишкеке, Оше, Джалал-Абаде и Республиканском перинатальном центре. Результаты показали, что за этот период количество роддомов, в которых проводился скрининг, увеличилось с 3 % до 37 %, что свидетельствует о постепенном внедрении этой практики в медицинскую систему. В городских районах скрининг прошли около 68 % новорожденных, тогда как в сельских районах – только 19 %, что свидетельствует о значительном неравенстве в доступе к медицинским услугам. Нарушение слуха было подозревалось у 1,7 % детей, из которых у 0,8 % была подтверждена потеря слуха. Помимо количественного анализа охвата скринингом, в ходе исследования был выявлен ряд организационных и социальных факторов, влияющих на эффективность раннего выявления нарушений слуха. В частности, значительную роль играл уровень осведомленности родителей о важности скрининга слуха и последующего наблюдения после первичного обследования: было установлено, что более половины семей, получивших положительный результат скрининга, не прошли повторную диагностику из-за недостатка информации или доступа к соответствующим медицинским услугам. Практическая ценность исследования заключается в том, что его результаты могут быть использованы для дальнейшего изучения проблемы раннего выявления нарушений слуха, улучшения системы здравоохранения, особенно в области отоларингологии и неонатального скрининга, а также для разработки эффективных стратегий своевременного вмешательства, которые улучшат качество жизни пациентов

Ключевые слова: аудиологическое тестирование; неонатальный скрининг; отоакустическая эмиссия; раннее вмешательство при отопатологии; первичный скрининг