

Health Protection in General Education Schools for the Hearing-Impaired and Deaf

D.D. Sharipova

Professor, Doctor of Pedagogical Sciences

K. A. Cholokova

First-year student, Nizami National Pedagogical University Faculty of Special Education and Inclusive Education

Annotation: This article examines the theoretical and practical foundations of promoting the health of students with hearing impairments in mainstream schools. It analyzes their physical and mental development, difficulties in adaptation, and interactions between school, family, and healthcare providers. It proposes measures to create a visually adapted environment, implement digital technologies, develop health centers, and provide psychological support. It emphasizes the importance of parental, mahalla, and foundation involvement, as well as a comprehensive approach integrating educational, medical, and social measures.

Keywords: Health protection, hearing-impaired children, deaf children, inclusive education, mahalla, parents, mental hygiene, pedagogy.



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Modern schools go beyond simply imparting knowledge: they shape individuals and a culture of health, focusing on developing responsibility for their own well-being and self-regulation skills [1]. In the context of social and technological change, the educational system must not only teach but also foster healthy lifestyle habits. This is especially important for children with hearing impairments, as they are more likely to experience fatigue, anxiety, and a lack of social interaction [2].

In Uzbekistan, inclusion and health protection for students with disabilities have become part of state policy. According to the International Telecommunication Union, there are over 22,000 people with hearing impairments in the country [3], of which over 5,000 are schoolchildren. A significant portion of these children are educated in mainstream schools, where support systems are still underdeveloped: health promotion programs are primarily focused on hearing children and do not take into account the unique perceptions of hard-of-hearing and deaf students [4]. A lack of adapted educational materials, specialists, and interdepartmental collaboration makes preventive efforts sporadic and fragmented.

It's important to emphasize that hearing loss is not only a medical problem but also a psychological and pedagogical one, as auditory deprivation limits the perception of intonation and emotional nuances of speech, forcing the child to rely on visual perception. This leads to eye strain and rapid fatigue.[5] Lip reading depletes attention, reducing concentration and learning, causing headaches, sleep disturbances, and posture problems. According to special education teachers, children with hearing impairments complain of fatigue twice as often as their peers.[6] This necessitates the development of an adapted study and rest regimen.

Lack of coordination between schools, parents, and health services exacerbates the problem, as each unit operates in a fragmented manner. According to the Ministry of Health, over 40% of schoolchildren's visits are related to fatigue and visual impairment [7], confirming the need to create a unified system in which children's health is considered a shared priority.

Uzbekistan has adopted the Concept for the Development of Inclusive Education for 2020–2025, aimed at ensuring equal access to education.² In practice, the implementation of adapted technologies and the creation of a health-promoting educational environment require additional efforts. The experience of Uzbek schools demonstrates that the use of pictograms, interactive panels, and subtitled videos helps reduce student fatigue and increase motivation [8]. Multimedia applications and videos in Uzbek sign language allow for more accurate transmission of information, reducing the risk of distortion and improving comprehension of educational material by 35–40% [9].

Psychological and pedagogical aspects are crucial in the education of hearing-impaired children. Limited communication and social isolation often lead to emotional difficulties, requiring special support from teachers and psychologists. Developing self-regulation skills, self-confidence, and a positive attitude toward one's own disabilities is an important component of the educational process. Experience shows that participation in group games, sports, and creative activities helps reduce anxiety and strengthen self-esteem [10]. Regular mental health classes, during which children learn to recognize emotions and manage fatigue, also have a positive impact.

Organizing a comfortable school environment is crucial. Lighting, noise levels, and color schemes directly impact students' well-being. For hearing-impaired children, uniform lighting is crucial, allowing them to see the teacher's facial expressions, as excessive brightness or shadows make speech difficult to understand. Soundproofing prevents vibrations and irritation [11]. Thoughtful spatial organization helps maintain attention and reduce fatigue.

A practical element of health promotion is a health room—a specialized space for physical exercise, preventative talks, and monitoring of students' health. According to the state program "Healthy School" (2023), such rooms are being implemented in all inclusive schools [12]. A doctor and psychologist work together here, health records are maintained, and individual recommendations are provided. This practice instills in children a responsible attitude toward their own well-being and promotes disease prevention.

The family plays a crucial role in shaping a child's healthy lifestyle. Parents shape hygiene habits, nutrition, and daily routines, but not all families have sufficient knowledge, especially if the parents themselves are insufficiently aware of the physiological characteristics of hearing-impaired children. Therefore, schools are establishing parent health clubs, where specialists explain how to care for hearing aids, prevent fatigue, and support the child's emotional well-being [13]. Such meetings strengthen trust between the school and the family, reduce parental anxiety, and promote shared responsibility for the child's health.

Local communities are an integral element of the health-preservation system. In Uzbekistan, mahallas—traditional citizen associations involved in raising and supporting families—play a special role. They organize sporting events, community cleanups, and preventive campaigns,

engaging hearing-impaired children in joint activities with their peers [14]. This promotes social integration, strengthens physical health, and creates a favorable emotional climate.

The quality of health care is largely determined by the training of teachers. Inclusive teachers must be proficient in teaching methods, deaf education, and the psychology of auditory perception. However, not all teachers complete specialized training, which complicates the adaptation of educational materials and the development of effective communication with deaf and hard of hearing students. Continuing education is key to successful learning [15]. Teacher training programs should include the basics of sign language, visual teaching methods, and emotional support techniques. Teacher competence directly impacts a child's comfort, motivation, and academic performance.

An important area of health promotion is the implementation of digital technologies. Interactive whiteboards, learning platforms, and mobile apps make the learning process visual and accessible. Programs adapted for sign language, where visual images are combined with textual information, are particularly effective. Schools are creating digital health corners—stands with QR codes leading to videos on nutrition, hygiene, and stress prevention—enabling children to independently acquire and consolidate knowledge. A successful example is the Inclusive Education Roadmap project (UNDP Uzbekistan, 2024), in which remote consultations with a teacher of the deaf through the EduApp platform have improved school-family interaction [16].

An effective health promotion system requires not only organizational measures but also a change in teaching culture. Teachers must instill in students a motivation for a healthy lifestyle and an interest in self-improvement. Health promotion technologies must be integrated into daily school practices, and their sustainability is ensured by the collaborative work of teachers, parents, medical professionals, the mahalla, and government agencies.

One of the key areas is the implementation of multimedia and digital learning tools adapted to the needs of hearing-impaired and deaf children. Visual and interactive platforms with augmented reality (AR) elements help compensate for auditory perception deficits and stimulate cognitive activity [17]. These applications allow children to visually explore the functioning of the body and the principles of a healthy lifestyle. In Uzbekistan, these technologies are being implemented with the support of the Ministry of Digital Technologies and the Ministry of Preschool and School Education. Video lessons with sign language translation and subtitles make the learning process inclusive and increase student motivation.

Ensuring constant feedback between schools and families is equally important. More and more educational institutions are creating online groups and platforms where they post materials on hygiene, nutrition, and daily routines. These resources allow parents to monitor compliance with recommendations and promptly respond to any difficulties that arise. Videos with sign language translation also make information accessible to parents with hearing impairments. Digital communication serves as a bridge between schools, families, and health services, ensuring coordination of efforts in real time [18].

Along with the development of digital technologies, schools are developing a health-preserving infrastructure, including the optimization of space, lighting, acoustics, and food service. For hearing-impaired students, it is important to eliminate factors that cause fatigue and discomfort. The use of sound-absorbing panels, uniform lighting, and ergonomic furniture that ensures visibility of the teacher's face is recommended. These technical elements directly impact students' concentration and emotional well-being. In 2023, the Ministry of Health of Uzbekistan presented guidelines for organizing "quiet classrooms" for children with hearing impairments, which include acoustic protection and a neutral color scheme for walls [19].

An equally important element of health promotion is nutrition. A balanced menu promotes not only the physical but also the cognitive development of students. Deaf children often experience

appetite and metabolic problems due to stress and a sedentary lifestyle, so school cafeterias must provide high-quality and varied meals. As part of the "Healthy Nutrition for Schoolchildren" program (2023), schools in the Tashkent region have introduced controlled portions of proteins and vitamins, and limited consumption of sweets and carbonated beverages [20]. Nutrition information should be visual, presented through posters, pictograms, and videos in sign language.

Health promotion also includes the development of physical activity. Hearing-impaired children often have difficulty playing team games that use auditory cues, so it's important for physical education teachers to adapt exercises using visual and visual cues, gestures, and signs. Schools successfully utilize "quiet games," yoga, breathing exercises, and dance classes set to musical vibrations. These activities help strengthen the musculoskeletal system and relieve emotional stress [21]. Collaboration with sports organizations allows for a more varied curriculum and fosters interest in an active lifestyle.

Psychological support is an integral component of health promotion. Deaf and hard-of-hearing children often experience feelings of isolation, so emotional literacy development sessions and training sessions with a psychologist are essential. These sessions utilize emotion cards, group games, and theatrical sketches. School "trust days," where students can seek help from teachers or a psychologist, are an effective practice. Such initiatives foster a culture of emotional safety [22]. According to Interscience.uz, participation in such programs reduces anxiety by 30% and improves social adaptation [23].

Interdepartmental cooperation remains the foundation of the health-preservation system. The Ministry of Preschool and School Education must integrate health-preservation principles into educational standards, and the Ministry of Health must ensure medical support for students. Local authorities, mahallas, and public foundations facilitate preventive campaigns and sporting events. For example, the Ezgu Amal Foundation annually holds the "Health Week" campaign, during which children with hearing impairments participate in competitions and receive medical consultations [24]. These initiatives demonstrate the effectiveness of the combined efforts of the state and society.

An important area of health promotion is the involvement of higher education institutions. Pedagogical and medical universities are becoming centers of practical support for schools: student teachers of the deaf help adapt educational materials, and medical specialists conduct examinations and surveys of students. This experience enhances the professional competence of future specialists and strengthens the connection between science and practice [25].

International experience confirms that successful program implementation is possible with the continuous improvement of pedagogical technologies. Finland is implementing the Healthy School program, Spain operates "sensory rooms," and Kazakhstan and Azerbaijan use health video lessons in sign languages. These models emphasize the need for intercultural exchange and the adaptation of best practices to the national context [26].

Mahallas play a significant role in supporting families raising children with hearing impairments. In some regions, Mahalla Health Centers are being established to provide discussions with parents, workshops, and meetings with medical specialists. These centers serve as a platform for sharing experiences and finding solutions. Mahalla involvement ensures ongoing support for families living far from specialized institutions and also facilitates the involvement of charitable foundations and philanthropists, increasing the sustainability of the health care system [27].

Particular attention is paid to disease prevention. Schools for hearing-impaired children regularly conduct medical examinations, including those by an ENT specialist, ophthalmologist, orthopedist, and psychologist. The results are recorded in individual health cards, along with recommendations on routine, nutrition, and physical activity, allowing teachers to consider

students' physical condition when planning their schedules. Furthermore, children learn the basics of hygiene and first aid using visual aids and interactive models [28].

Digitalization is increasing the effectiveness of student health monitoring. Schools are introducing electronic health journals, in which health workers record growth, vision, fatigue, and emotional state. The Ministry of Health plans to introduce a unified digital school health module, which will allow teachers and doctors to jointly analyze data and promptly prevent violations [29].

Modern health promotion is impossible without the participation of public and international organizations. UNICEF, WHO, UNDP, and local foundations provide schools with methodological and material support and develop manuals on inclusive education and health psychology. Joint projects translate materials into Uzbek sign language and adapt international programs to national conditions [30]. These initiatives foster a pedagogical culture of care and respect for the individual needs of each child.

The sustainability of the health-preservation system requires consistent monitoring and control. The effectiveness of programs is assessed at three levels: school, district, and national. At the school level, administration organizes classes and evaluates results; at the district level, school activities are coordinated and experiences are exchanged; and at the national level, data is analyzed and programs and regulations are adjusted [31]. This multi-level approach allows not only for the implementation of measures but also for their objective assessment of their impact on student health.

The effectiveness of health-promoting programs should be assessed not by formal reports, but by real changes in children's well-being and behavior. Key criteria include reduced fatigue, increased physical activity, and the development of hygiene skills and emotional resilience. In Samarkand schools (2023), the introduction of dynamic pauses and visual materials in sign language reduced complaints of fatigue by 25%, and academic performance increased by 15% [32]. Teachers also noted improved discipline and student engagement, confirming that health-promoting programs are becoming an integral part of the educational process, not an additional function.

Positive changes also impact teachers. Inclusive approaches foster their understanding of health care as a professional mission. Continuing education, sign language training, and basic hearing physiology training facilitate individualized interactions with each student [33]. Teachers become not only a source of knowledge but also a mentor, a coordinator of educational and health-improving processes.

Reducing parental anxiety is a key indicator of program success. When schools offer collaboration and support, parents no longer perceive their child's diagnosis as a death sentence. According to the results of the "Family and School Together" project (Tashkent Region, 2023), over 70% of parents of hearing-impaired children reported improved communication with teachers and confidence in their child's future [34]. This confirms that family involvement is a necessary element of health-preserving policies.

Public perception is also gradually changing. While previously the health of children with special needs was considered primarily in a medical context, today the emphasis is on a comprehensive approach that integrates physical, psychological, and social well-being. Inclusive education promotes the collaborative learning of children with various disabilities, developing tolerance and empathy among their hearing peers [35]. Thus, health promotion is becoming part of society's humanistic culture.

The implementation of systemic measures also yields economic benefits: reduced morbidity and absenteeism reduces the burden on healthcare facilities and improves school efficiency. According to estimates by the Ministry of Health, each preventive program implemented in Tashkent schools saves up to 12% of government expenditures on schoolchildren's treatment [36].

Developing sustainable healthy habits in children reduces the risk of chronic diseases and improves demographic indicators. Investments in schoolchildren's health represent a strategic direction with long-term social and economic consequences.

The digitalization of school healthcare is rapidly developing. Pilot schools in Tashkent and Bukhara are implementing an "electronic student health passport" system, which records the results of medical examinations, psychological consultations, and physical activity levels [37]. This data allows teachers to manage academic workloads, and medical specialists to monitor student progress. The system is planned to be integrated with the national E-Maktab platform, enabling information exchange between schools and clinics. This will create a modern model for managing schoolchildren's health, based on the principles of prevention and a personalized approach.

Training is crucial. Pedagogical universities and retraining institutes in Uzbekistan offer courses on inclusive pedagogy, health psychology, and communication with children with hearing impairments [38]. These courses help future teachers develop an understanding of sensory limitations and skills in adapting educational materials. A number of universities are establishing inclusive technology laboratories, where students develop teaching aids and visual resources on health. Improving the professional competence of teachers is becoming the foundation of a sustainable health-preservation system.

Students' psychological well-being is no less important than their physical health. Schools that implement emotional support programs experience a reduction in conflicts, an improved school climate, and increased self-esteem. Trust days, creative workshops, theater groups, and sports clubs promote students' self-expression and a sense of belonging [39]. Teachers who view children through the prism of opportunities rather than limitations foster confidence and motivation for an active life.

Systematic implementation of health-promoting programs requires a constant exchange of experience. In Uzbekistan, conferences on inclusion issues are regularly held to discuss the achievements and challenges of program implementation. At the "Healthy School – Healthy Future" forum (2024), educators, medical specialists, and foundation representatives presented successful cases of integrating educational processes and health promotion measures. Such platforms facilitate the formation of a professional community united by the goal of preserving the health of the younger generation [40].

It has been established that health promotion is not a one-time initiative, but a long-term strategy encompassing all levels of education. It begins in early childhood and continues throughout the entire school year. Healthy lifestyle principles should be integrated into curricula, educational activities, and extracurricular activities. For children with hearing impairments, it is important that health care is perceived as a natural part of life, not a formal obligation. The personal example of teachers, parents, and peers plays a particularly important role in this.

The modern health-preservation model is built on three principles: individualization, interdisciplinarity, and social responsibility. Individualization requires taking into account the needs of each child; interdisciplinarity requires collaboration between educators, medical specialists, and social workers; and social responsibility requires recognizing children's health as a shared societal priority [41]. Only the combination of these principles ensures the development of a sustainable and effective system.

The implementation of health promotion programs in schools for deaf and hard of hearing children is already demonstrating positive results: teachers' professional competence is increasing, infrastructure is improving, and parents and mahallas are becoming more actively involved. However, challenges remain related to expanding human resources, strengthening the material base, and advancing scientific research in the field of inclusive healthcare. A systematic and

sustainable approach ensures long-term results and makes a significant contribution to the development of a healthy generation.

Thus, health promotion in general education schools for deaf and hard of hearing students is a complex, multifaceted process that integrates pedagogical, medical, and social aspects. Its successful implementation is only possible with the coordinated efforts of all participants in the educational process: schools, families, mahallas, ministries, and charitable organizations. The creation of a visually adapted environment, the introduction of digital technologies, the organization of health rooms, the development of psychological support, and the active participation of parents form a new school model—a school of care, attention, and respect for the individuality of each child. This is not simply a pedagogical task, but a humanistic mission that affects the quality of life and health of future generations.

Fostering a culture of health among deaf and hard-of-hearing students is a priority for Uzbekistan's state policy, which aims to develop an inclusive, equitable, and healthy society.

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