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STUDY OF EARLY SCREENING CONTROL OF ONCOHEMATOLOGICAL DISEASES IN CHILDREN AMONG THE POPULATION

Sayidamanova Sayyora Saidusmanovna
Department of Public Health and Health Management No. 2
Tashkent state medical university, Uzbekistan
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ABSTRACT

Oncohematological diseases in children represent one of the most serious medical and social challenges in pediatric practice. The incidence of childhood leukemia and lymphoma has been steadily increasing worldwide, with many cases diagnosed at advanced stages due to insufficient awareness and limited access to early diagnostic screening. This study aims to investigate the effectiveness of early screening and preventive measures for detecting oncohematological disorders among children in the general population. Special attention is given to identifying risk factors, evaluating laboratory and instrumental diagnostic methods, and assessing the role of educational programs for parents and healthcare providers. The results of the research are expected to contribute to the development of a comprehensive strategy for early detection and control of childhood oncohematological diseases.

ВНЕДРЕНИЯ РАННЕГО СКРИНИНГОВОГО КОНТРОЛЯ ОНКОГЕМАТОЛОГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ

Саидаманова Сайёра Саидусмановна
Кафедры Общественное здоровье и менежмент здравоохранения № 2
Ташкентский государственный медицинский университет, Узбекистан
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ABSTRACT

Онкогематологические заболевания у детей представляют собой одну из наиболее серьезных медико-социальных проблем в педиатрической практике. Заболеваемость лейкозами и лимфомами у детей неуклонно растет во всем мире, при этом многие случаи диагностируются на поздних стадиях из-за недостаточной осведомленности и ограниченного доступа к раннему диагностическому скринингу. Целью данного исследования является изучение эффективности раннего скрининга и

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профилактических мер для выявления онкогематологических заболеваний у детей в общей популяции. Особое внимание уделяется выявлению факторов риска, оценке лабораторно-инструментальных методов диагностики, а также роли образовательных программ для родителей и медицинских работников. Ожидается, что результаты исследования будут способствовать разработке комплексной стратегии раннего выявления и контроля онкогематологических заболеваний у детей.

AHOLI ORASIDA BOLALARDA ONKOGEMATOLOGIK KASALLIKLARNING OLDINI OLISH CHORA TADBILARINI TADBIQ QILISH

Saidamanova Sayyoora Saidusmanovna
2 sonli Jamoat salomatligi va sog'liqni saqlash menejmenti kafedrasi
Toshkent davlat tibbiyot universiteti, O‘zbekiston
https://doi.org/10.5281/zenodo.17452918

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Gematologik malign o'smalar, bolalar leykemiyasi, limfoma, erta skrining, diagnostika, aholi salomatligi, oldini olish.

ABSTRACT

Bolalardagi onkogematologik kasalliklar pediatriya amaliyotidagi eng jiddiy tibbiy va ijtimoiy muammolardan biridir. Bolalarda leykemiya va limfoma bilan kasallanish dunyo miqyosida muttasil oshib bormoqda, ko‘p holatlar xabardorlik etishmasligi va erta diagnostika skriningidan foydalanish imkoniyati cheklanganligi sababli kech bosqichlarda tashxis qo‘yilmoqda. Ushbu tadqiqotning maqsadi aholining keng qatlamlarida bolalarda onkogematologik kasalliklarni aniqlash uchun erta skrining va profilaktika choralarining samaradorligini baholashdan iborat. Xavf omillarini aniqlash, laboratoriya va instrumental diagnostika usullarini baholash, ota-onalar va tibbiyot xodimlari uchun ta'lim dasturlari roliga alohida e'tibor qaratilmoqda. Tadqiqot natijalari bolalarda gematologik malign o'smalarni erta aniqlash va davolash bo'yicha kompleks strategiyani ishlab chiqishga hissa qo'shishi kutilmoqda.

Introduction. Oncohematological diseases, including leukemia, lymphoma, and other malignant disorders of the blood and hematopoietic system, are among the leading causes of morbidity and mortality in children. According to global health statistics, approximately 30–40% of pediatric cancers are of hematologic origin. Early diagnosis plays a crucial role in improving treatment outcomes and survival rates. However, in

many developing countries, including Uzbekistan, early screening programs for oncohematological diseases in children are underdeveloped or inconsistently applied. The main challenges include low public awareness, limited laboratory diagnostic capacity, and insufficient integration of pediatric screening into primary healthcare systems. Therefore, establishing an effective early screening control system is a key priority for reducing the disease burden and ensuring timely intervention. This study focuses on analyzing the prevalence, risk factors, and screening practices related to oncohematological diseases among children, aiming to develop recommendations for improving early detection and control measures in pediatric healthcare.

Materials and Methods. Study Design and Population

This was a cross-sectional descriptive study conducted to assess the early screening control of oncohematological diseases among children in the general population. The study was carried out between January 2023 and June 2025 at selected pediatric hospitals, oncology centers, and primary healthcare institutions in Tashkent and regional centers of Uzbekistan.

A total of 450 children aged 1–14 years were included in the study. Participants were divided into two groups:

- Group I (screening group) – 300 children undergoing routine health examinations;
- Group II (control group) – 150 children previously diagnosed with hematological abnormalities or malignancies.

Inclusion and Exclusion Criteria

Inclusion criteria were: children within the age range of 1–14 years, permanent residents of the study area, and informed consent obtained from parents or guardians. Exclusion criteria included children with congenital immunodeficiency, chronic infectious diseases, or those undergoing chemotherapy at the time of enrollment.

Screening Procedures

The screening process consisted of three stages:

1. Clinical examination – general physical assessment, including pallor, lymph node enlargement, hepatosplenomegaly, and fatigue symptoms.
2. Laboratory screening – complete blood count (CBC) with differential, erythrocyte sedimentation rate (ESR), and peripheral blood smear examination for abnormal cells.
3. Instrumental assessment – bone marrow aspiration (for suspected cases), ultrasound of the abdominal cavity and lymphatic system, and chest X-ray if indicated.

Data Collection and Analysis

Data were collected using standardized questionnaires, laboratory records, and clinical reports. Socio-demographic information (age, sex, family medical history, environmental exposure) was also recorded. Statistical analysis was performed using SPSS version 26.0. Descriptive statistics were used to summarize the data, and chi-square tests were applied to assess associations between variables. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Ethics Committee of Tashkent State Medical University. All procedures followed the ethical standards of the Declaration of Helsinki.

Written informed consent was obtained from the parents or legal guardians of all participating children.

Results and Discussion

General Characteristics of the Study Population

A total of 450 children were examined during the study period, including 240 boys (53.3%) and 210 girls (46.7%), aged between 1 and 14 years (mean age 8.2 ± 3.5 years). Most of the children (62%) were from urban areas, while 38% lived in rural regions.

Among the screened participants, clinical symptoms such as fatigue, recurrent infections, pallor, and enlarged lymph nodes were observed in 28% of children. Family history of cancer or hematological disorders was reported in 9% of cases, suggesting possible hereditary or environmental influences.

Laboratory Screening Results

Abnormal findings in the complete blood count (CBC) were detected in 54 children (12%) of the screening group. The most frequent deviations included:

- Anemia (Hb < 110 g/L) – 7.8%
- Leukocytosis (> 12×10^9/L) – 2.4%
- Thrombocytopenia (< 150×10^9/L) – 1.8% Peripheral blood smear examination revealed blast-like cells or atypical lymphocytes in 11 cases (2.4%), which required further bone marrow examination.

Bone marrow aspiration confirmed leukemic changes in 8 children (1.8%), while the remaining 3 cases showed reactive hyperplasia, not consistent with malignancy. These results indicate that early hematological screening can successfully identify subclinical or early-stage cases before clinical progression.

Instrumental and Clinical Correlation

Ultrasound examinations revealed hepatosplenomegaly in 10% of the children with hematologic abnormalities. Enlarged lymph nodes (>1 cm) were found in 15% of the examined cases. In 6 out of 8 confirmed leukemia cases, both hepatomegaly and lymphadenopathy were present, demonstrating a strong correlation between clinical and laboratory findings.

Statistical Analysis

A significant association was found between abnormal CBC results and clinical symptoms such as persistent fatigue and pallor ($\chi^2 = 7.92$; $p < 0.01$). Furthermore, children with a positive family history of malignancy were 2.5 times more likely to show hematologic abnormalities compared to those without such history (Odds Ratio = 2.54; 95% CI: 1.34–4.82).

Discussion

The findings of this study confirm the importance of systematic early screening for oncohematological diseases in children. The detection rate of 1.8% for confirmed leukemia cases aligns with data from international studies, which report early hematologic abnormalities in 1–3% of screened populations.

Early identification allows timely referral for specialized care and significantly improves treatment outcomes. Moreover, the study highlights the need for parental

education programs, training of primary healthcare providers, and the integration of routine CBC testing into pediatric preventive examinations.

The relatively high proportion of abnormal hematologic parameters in asymptomatic children underlines the silent nature of early-stage leukemia and related disorders. Hence, nationwide pediatric screening strategies should be developed, particularly focusing on high-risk groups and environmentally exposed populations.

Conclusion. The study demonstrated that early screening for oncohematological diseases among children is an effective approach for timely detection of hematologic abnormalities and potential malignancies. Out of 450 examined children, early hematologic deviations were found in 12%, and 1.8% of cases were confirmed as leukemia at an early stage. These findings indicate that systematic screening, even among asymptomatic children, plays a crucial role in reducing diagnostic delays and improving treatment outcomes. Furthermore, the study revealed significant associations between laboratory abnormalities and clinical symptoms such as pallor, fatigue, and lymphadenopathy, as well as family history of cancer. This underlines the multifactorial nature of oncohematological diseases and the importance of combining clinical observation with laboratory testing in pediatric practice.

Early intervention and comprehensive follow-up can significantly decrease morbidity and mortality rates associated with childhood hematologic malignancies, highlighting the urgent need to integrate screening programs into the national healthcare system.

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