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EPIDEMIOLOGICAL CHARACTERISTICS OF VIRAL HEPATITIS A IN THE REPUBLIC OF KARAKALPAKSTAN (2017–2024)

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Abstract

The article presents a detailed epidemiological characterization of viral hepatitis A (VHA) in the Republic of Karakalpakstan for the 2017–2024. A retrospective analysis of morbidity dynamics by age groups was conducted. A wave-like pattern of the epidemic process was established, with a decrease in incidence rates in 2020–2021 and the formation of a new rise in 2023–2024. It was revealed that the main proportion of cases occurs among children aged 1–5 and 6–14 years. The obtained results indicate the need to strengthen preventive and sanitary-hygienic measures.

Keywords: Hepatitis A, epidemiology, incidence, children, Karakalpakstan, dynamics.

Introduction

Viral hepatitis A (VHA) remains one of the most widespread enteric viral infections worldwide, representing a significant medical and social concern [1,2]. According to estimates by the World Health Organization, millions of cases are reported annually; however, the true prevalence is considerably higher due to the large proportion of subclinical and asymptomatic infections [1,3].

The epidemic process of VHA is characterized by a fecal–oral transmission route, a pronounced dependence on sanitary and hygienic conditions, cyclic fluctuations in incidence rates, and high susceptibility among children [4,5]. In regions with intermediate endemicity, there is a gradual shift of incidence toward older age groups due to changes in the population's immune structure [6,7].

In the Republic of Karakalpakstan, taking into account climatic conditions, demographic characteristics, and the specific features of water supply in certain districts, hepatitis A remains a relevant public health issue requiring in-depth analysis.

Objective

To conduct an epidemiological assessment of long-term trends and the age structure of VHA incidence in the Republic of Karakalpakstan for the period 2017–2024.

The study was based on official statistical data from the Ministry of Health of the Republic of Uzbekistan and regional sanitary-epidemiological services on VHA incidence for 2017–2024.

Statistical data processing was carried out using Microsoft Excel 2019.

The following indicators were analyzed:

- incidence rates (per 100,000 population);
- age structure of cases;
- long-term dynamics of the epidemic process.

Methods of descriptive epidemiology, comparative analysis, calculation of growth/decline rates, and assessment of trends and cyclicity were applied.

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Overall Incidence Dynamics

The analysis showed that in 2017–2018, a high level of incidence was recorded. This period was characterized by active circulation of the virus among children and pronounced territorial heterogeneity.

In 2019, a gradual decrease in incidence rates was observed; however, the epidemic process was not completely interrupted.

In 2020–2021, a sharp decline in incidence was recorded, with indicators reaching their lowest values for the entire study period.

Starting from 2022, an upward trend emerged, which became clearly pronounced in 2023–2024, indicating the formation of a new wave of epidemic increase.

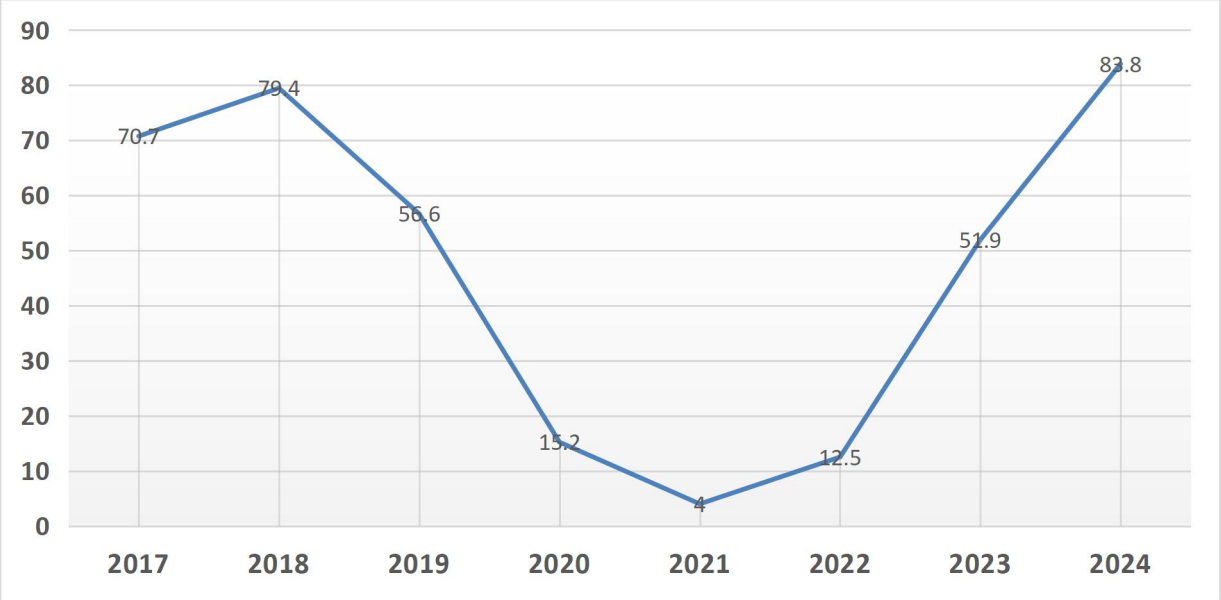

Figure 1. Dynamics of Hepatitis A Incidence in the Republic of Karakalpakstan (2017–2024)

Age Structure

The largest proportion of cases consistently occurs among children aged 1–5 years. The second most affected group is children aged 6–14 years.

Among the adult population, incidence rates remain minimal; however, during periods of epidemic increase (2017–2018 and 2023–2024), a relative rise in the proportion of cases among older age groups is observed. This indicates a shift in the age structure toward older categories under conditions of changing population immunity.

Of particular interest is the age structure dynamics during the years of decreased incidence (2020–2021). During this period, a reduction in incidence was observed across all age groups; however, the relative proportion of children remained high. This highlights the leading role of the pediatric population in sustaining the epidemic process.

During the periods of renewed increase (2023–2024), the rise in incidence again began with younger age groups, confirming their key role in the epidemiology of VHA.

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Thus, the age structure of incidence reflects the endemic nature of the infection, with predominant involvement of younger and school-age children. The formation of a stable immune layer in the population occurs primarily through natural infection during childhood.

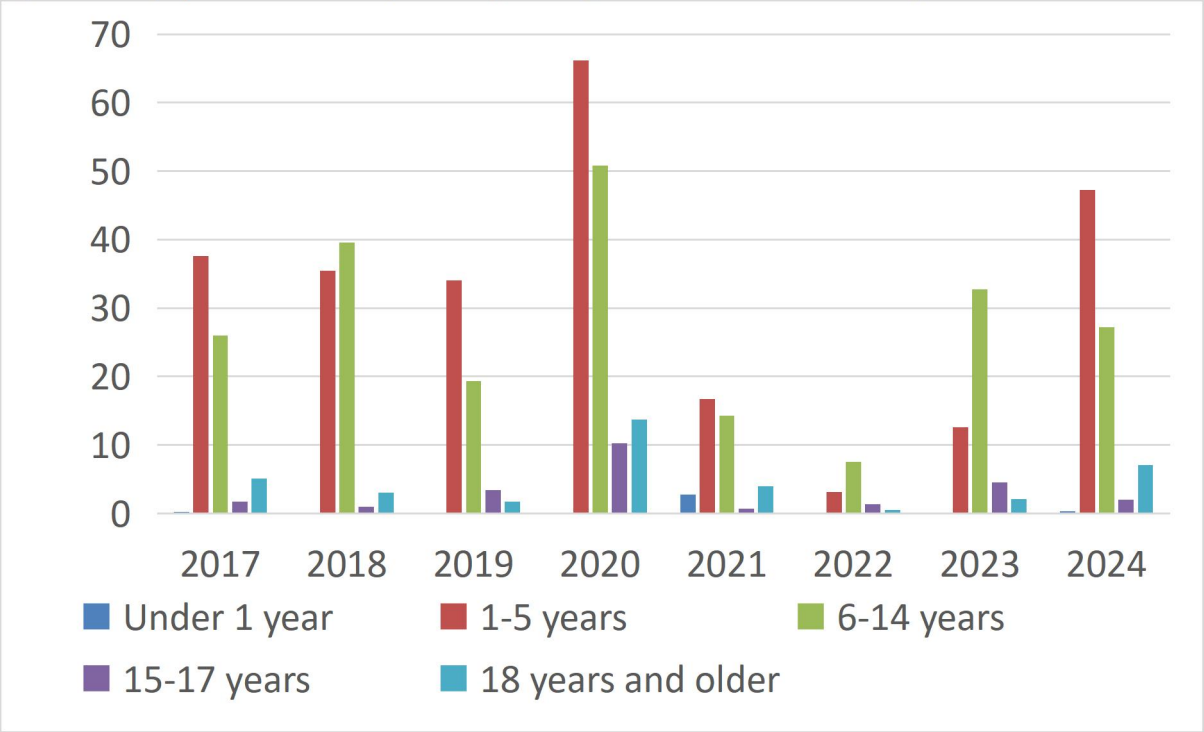

Figure 2. Age Structure of Hepatitis A Incidence (2017–2024)

Discussion

The obtained results indicate a wave-like pattern of the VHA epidemic process, which is consistent with data from international studies [4,8]. The cyclic nature of incidence is обусловлена формированием и истощением иммунной прослойки в популяции.

The sharp decline in incidence rates in 2020–2021 is likely associated with restrictive measures implemented during the COVID-19 pandemic, which led to reduced contact rates and strengthened sanitary and hygienic practices. Similar trends have been reported in several countries in Europe and Asia [9,10].

The emergence of a new increase in 2023–2024 can be explained by the accumulation of a susceptible population due to reduced natural circulation of the virus in previous years. This mechanism of an “immunity gap” has been described in the literature as a factor contributing to subsequent epidemic outbreaks [6,11].

The predominance of pediatric age groups in the incidence structure confirms the persistent endemic nature of the infection. The high involvement of children aged 1–5 and 6–14 years corresponds to the characteristics of transmission in organized settings [5,12].

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The shift in the proportion of cases toward older age groups during periods of increased incidence may indicate gradual changes in the population's immune structure, which is typical for regions with intermediate endemicity [7,13].

Thus, the epidemic process of VHA in the region is determined by a combination of natural-climatic, social, and demographic factors, as well as the level of herd immunity. The findings are consistent with current concepts regarding the transformation of the epidemiology of viral hepatitis A in regions with intermediate endemicity.

Conclusions

1. The epidemic process of viral hepatitis A in the Republic of Karakalpakstan in 2017–2024 is characterized by pronounced cyclicity and a wave-like pattern.
2. The lowest incidence rates were recorded in 2020–2021, likely associated with restrictive measures and reduced contact activity of the population.
3. In 2023–2024, a new epidemic rise was observed, обусловленный накоплением восприимчивого контингента.
4. Children aged 1–14 years play a leading role in maintaining the epidemic process.
5. Stabilization of the epidemiological situation requires a comprehensive set of preventive measures aimed at reducing the risk of infection spread.

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