COMPARATIVE DIAGNOSIS OF VIRAL HEPATITIS: EPIDEMIOLOGY, CLINICAL COURSE, AND THERAPEUTIC CHARACTERISTICS

Ibraximova H.R., Masharipova Sh.S., Matyakubova O.U., Otajonov Sh.Z.

Urganch State Medical Institute, Urgench, Uzbekistan

Abstract. Viral hepatitis represents a heterogeneous group of liver infections caused by hepatitis A, B, C, D, and E viruses and remains a major global health challenge. Despite similarities in clinical presentation, these infections differ significantly in epidemiological distribution, modes of transmission, disease progression, and therapeutic strategies. This study provides a comparative analysis of viral hepatitis types A–E, focusing on epidemiological characteristics, clinical course, diagnostic markers, and treatment-specific features. A narrative review of peer-reviewed literature and international clinical guidelines was conducted to synthesize current evidence. The results demonstrate that hepatitis A and E are predominantly acute, self-limiting infections associated with fecal–oral transmission, whereas hepatitis B, C, and D are mainly transmitted parenterally and have a high risk of chronicity. Chronic infections are closely linked to progressive liver disease, including cirrhosis and hepatocellular carcinoma. Advances in antiviral therapy, particularly direct-acting antivirals for hepatitis C, have markedly improved treatment outcomes, while management of hepatitis B and D remains challenging. Comparative diagnosis integrating epidemiological data, clinical manifestations, and specific laboratory markers is essential for accurate diagnosis, appropriate treatment selection, and effective prevention of complications.

Keywords: Viral hepatitis; Comparative diagnosis; Epidemiology; Clinical course; Hepatitis A; Hepatitis B; Hepatitis C; Hepatitis D; Hepatitis E; Antiviral therapy

Introduction

Viral hepatitis is one of the leading causes of chronic liver disease worldwide and represents a major public health concern. Hepatitis A, B, C, D, and E viruses are hepatotropic pathogens that primarily affect the liver and may result in acute or chronic inflammation. Although these infections share common clinical manifestations such as jaundice, fatigue, and elevated liver enzymes, they differ markedly in epidemiology, transmission pathways, natural history, and response to treatment. Misdiagnosis or delayed diagnosis can lead to inappropriate management and increased risk of complications. Therefore, a comparative diagnostic approach is essential for effective clinical decision-making, prognostic evaluation, and implementation of preventive strategies. This article aims to comprehensively compare viral hepatitis types A–E with emphasis on epidemiological features, clinical course, diagnostic markers, and therapeutic characteristics.

Materials and Methods

This study was designed as a narrative comparative review of the scientific literature. Data were collected from peer-reviewed articles, systematic reviews, epidemiological reports, and international clinical guidelines related to viral hepatitis. Publications addressing hepatitis A, B, C, D, and E in adult populations were included. Studies limited exclusively to pediatric populations or non-viral liver diseases were excluded. The collected data were analyzed comparatively according to epidemiological distribution, routes of transmission, clinical manifestations, disease progression, laboratory diagnostic criteria, and treatment strategies. Emphasis was placed on identifying distinguishing features that facilitate differential and comparative diagnosis.

The epidemiology of viral hepatitis varies widely by virus type and geographic region. Hepatitis A and E are predominantly found in areas with poor sanitation and limited access to clean drinking water. These infections are closely associated with socioeconomic factors and frequently occur as outbreaks linked to contaminated

food or water. Hepatitis E is particularly dangerous in pregnant women, with increased rates of severe disease and mortality.

Hepatitis B remains highly endemic in sub-Saharan Africa, East Asia, and parts of the Middle East, where vertical and early childhood transmission are common. Hepatitis C infection is mainly associated with bloodborne exposure, including unsafe injections, blood transfusions, and intravenous drug use. Hepatitis D infection occurs exclusively in individuals infected with HBV and is more prevalent in regions where HBV is endemic.

Clinical Course

HAV and HEV infections usually present as acute hepatitis with symptoms such as malaise, nausea, abdominal pain, jaundice, and dark urine. These infections are typically self-limiting, and chronic disease does not develop. However, fulminant hepatitis may occur in elderly patients or those with pre-existing liver disease.

HBV infection demonstrates a wide clinical spectrum. Acute infection may resolve spontaneously or progress to chronic hepatitis, particularly in individuals infected at a young age. Chronic HBV infection may remain inactive or progress to liver fibrosis, cirrhosis, and hepatocellularcarcinoma. HCV infection is often asymptomatic during the acute phase, leading to delayed diagnosis. The majority of patients develop chronic infection, which slowly progresses to advanced liver disease. HDV infection is associated with the most severe clinical outcomes. Superinfection in HBV carriers frequently results in rapid progression to cirrhosis and liver failure.

Diagnostic and Laboratory Findings

Biochemical abnormalities such as elevated alanine aminotransferase and aspartate aminotransferase levels are common across all viral hepatitis types but are not virus-specific. Definitive diagnosis relies on serological and molecular markers. Acute HAV and HEV infections are confirmed by detection of IgM antibodies. HBV

diagnosis requires interpretation of multiple markers, including HBsAg, anti-HBc, HBeAg, and HBV DNA. Active HCV infection is confirmed by detection of HCV RNA, while HDV infection is diagnosed by detecting anti-HDV antibodies and HDV RNA in HBsAg-positive individuals.

Treatment Characteristics

HAV and HEV infections are managed with supportive therapy, including rest, hydration, and nutritional support. Antiviral therapy is not routinely indicated. Chronic HBV infection is treated with nucleos(t)ide analogues or pegylated interferon-alpha to suppress viral replication and reduce disease progression. HCV treatment has been revolutionized by direct-acting antivirals, which achieve high rates of sustained virologic response and functional cure. HDV treatment options remain limited, with pegylated interferon-alpha providing modest benefits. Novel therapeutic agents are currently under investigation.

Discussion

This comparative analysis highlights the marked heterogeneity among viral hepatitis infections. Differences in epidemiological patterns and transmission routes influence disease distribution and prevention strategies. The tendency toward chronicity in HBV, HCV, and HDV infections necessitates early diagnosis and long-term monitoring. Although significant progress has been made in antiviral therapy, particularly for HCV, global disparities in access to diagnosis and treatment persist.

Conclusion

Viral hepatitis represents a complex and heterogeneous group of infectious liver diseases with substantial differences in epidemiological distribution, modes of transmission, clinical progression, and therapeutic response. Although hepatitis A, B, C, D, and E viruses share common clinical and biochemical features, each requires a distinct diagnostic and management strategy.

The acute, self-limiting nature of hepatitis A and E contrasts with the high risk of chronic infection associated with hepatitis B, C, and D. Chronic viral hepatitis remains a major cause of liver cirrhosis, hepatic decompensation, and hepatocellular carcinoma, resulting in significant long-term morbidity and mortality. The particularly aggressive course of hepatitis D infection underscores the importance of early detection of co-infection and superinfection in patients with chronic hepatitis B.This study demonstrates that an integrated comparative diagnostic approach—combining epidemiological data, clinical presentation, and virus-specific serological and molecular markers—is essential for accurate etiological diagnosis. Such an approach facilitates timely initiation of appropriate therapy, improves prognostic assessment, and supports effective patient monitoring. Advances in antiviral therapy, especially the development of direct-acting antivirals for hepatitis C, have transformed treatment outcomes and offer realistic prospects for disease elimination. However, persistent challenges in the management of hepatitis B and D, limited curative options, and unequal access to healthcare resources highlight the need for continued research and public health efforts. In conclusion, strengthening comparative diagnostic strategies, expanding vaccination coverage, improving access to antiviral treatment, and reinforcing preventive and educational programs are critical steps toward reducing the global burden of viral hepatitis and achieving long-term disease control.

References

1.S., Masharipova S., et al. "A Method for Obtaining Precipitating Serums for the Detection of Human Seminal Fluid Used in the Study of Physical Evidence in Forensic Biological Laboratories." *World Bulletin of Management and Law*, vol. 19, 7 Feb. 2023, pp. 42-44.

2. Машарипова, Ш. С., Ибрахимова, Х. Р., & Машарипов, С. М. (2023). Анализ эпидемиологических особенности диарейных заболеваний у детей

южного приаралья. *O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI*, *2*(15), 884-887.

3. PATHOGENETIC PRINCIPLES OF ACUTE INFECTIOUS INTESTINAL INFECTIONS AND FEATURES OF CLINICAL COURSE AMONG CHILDREN OF DIFFERENT AGES. (2024). *Multidisciplinary Journal of Science and Technology*, *4*(2), 357-365. https://www.mjstjournal.com/index.php/mjst/article/view/877

4. Машарипова, Ш. С., Ибрахимова, Х. Р., & Машарипов, С. М. (2023). Анализ эпидемиологических особенности диарейных заболеваний у детей южного приаралья. *O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI*, *2*(15), 884-887.

5. Ибрахимова Хамида Рустамовна, Нурллаев Руслон Рустамбекович, & Артиков Икром Ахмеджанович (2020). ВЫЯВЛЕНИЕ ТУБЕРКУЛЕЗА В ХОРЕЗМСКОЙ ОБЛАСТИ. Наука и образование сегодня, (6-1 (53)), 83-84. doi: 10.24411/2414-5718-2020-10602

6. PATHOGENETIC PRINCIPLES OF ACUTE INFECTIOUS INTESTINAL INFECTIONS AND FEATURES OF CLINICAL COURSE AMONG CHILDREN OF DIFFERENT AGES. (2024). *Multidisciplinary Journal of Science and Technology*, *4*(2), 357-365. https://www.mjstjournal.com/index.php/mjst/article/view/877

7. Аскарова, Р. И., Юсупов, Ш. Р., & Ибрахимова, Х. Р. (2020). Анализ причин развития туберкулеза у детей и подростков. *Главный редактор–ЖА РИЗАЕВ*, *27*.

8. Ибрахимова, Х. Р., Отажанов, Ш. З., & Матякубова, О. У. (2019). ТУБЕРКУЛЕЗНЫЙ МЕНИНГИТ У БОЛЬНЫХ, ПРОЖИВАЮЩИХ В ХОРЕЗМСКОЙ ОБЛАСТИ. In *INTERNATIONAL SCIENTIFIC REVIEW OF THE PROBLEMS OF NATURAL SCIENCES AND MEDICINE* (pp. 96-104).

9. Ibraximova, H. R., Nurllayev, R. R., & Matyaqubova, O. U. (2023). KICHIK YOSHDAGI BOLALAR ORASIDA ICHAK PARAZITAR KASALLIKLARINING EPIDEMIOLOGIK XUSUSIYATLARI. *Новости образования: исследование в XXI веке*, *2*(15), 109-114.

10. Artikov, I. A., Sadullaev, S. E., Ibrakhimova, H. R., & Abdullayeva, D. K. (2023). *RELEVANCE OF VIRAL HEPATITIS EPIDEMIOLOGY. IMRAS, 6 (7), 316–322*.

11. Artikov, I. A., Sadullaev, S. E., Ibrakhimova, H. R., & Abdullayeva, D. K. (2023). *RELEVANCE OF VIRAL HEPATITIS EPIDEMIOLOGY. IMRAS, 6 (7), 316–322*.

12. Ibrakhimova, H. R., Matyakubova, O. U., Sadullaev, S. E., & Abdullayeva, D. K. (2023). *HELMINTISES IN CHILDREN AMONG THE POPULATION IN UZBEKISTAN. IMRAS, 6 (7), 323–327*.

13. Ibrakhimova, H. R., Sh YS Artikov IA PARAZITAR KASALLIKLAR, and NATIJASIDA INSON ORGANIZMIDA KUZATILADAIGAN ALLERGIK HOLATLAR. "Новости образования: исследование в XXI веке.–2023." *T* 2: 97-102.

14. Ибрахимова, Х. Р., Матьякубова, О. У., Садуллаев, С. Э., & Абдуллаева, Д. К. (2023). ГЕЛЬМИНТЫ У ДЕТЕЙ СРЕДИ НАСЕЛЕНИЯ УЗБЕКИСТАНА. *IMRAS*, *6*(7), 323-327.

15. Ибрахимова, Х. Р. Машарипова Шохиста Собировна, Матякубова Айша Уриновна, & Артиков Икром Ахмеджанович (2023). *ИНФИЦИРОВАНИЕ БОЛЬНЫХ ТУБЕРКУЛЕЗОМ ОТ ЖИВОТНЫХ В НЕБЛАГОПОЛУЧНЫХ ПО ТУБЕРКУЛЕЗУ ХОЗЯЙСТВАХ. Проблемы современной науки и образования,(7 (185))*, 48-53.

16. Ҳамида Рустамовна Ибрахимова (2022). ПАРАЗИТАР КАСАЛЛИКЛАР ТАШҲИСЛАНГАН ТУРЛИ ЁШДАГИ ОДАМЛАРДА

ИММУН СТАТУСИГА ТАВСИФ. Academic research in educational sciences, 3 (4), 812-819. doi: 10.24412/2181-1385-2022-4-812-819

17. CLINICAL FEATURES OF ESCHERICHIOSIS IN CHILDREN. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(6), 220-224. https://mjstjournal.com/index.php/mjst/article/view/3928

18. Игамова, М. А., and А. Р. Облокулов. "Иброхимова ҲР (2023)." *Тениаринхоз ташҳисланган турли ёшдаги беморларда иммун ва цитокин статусига тавсифи. Тиббиётда янги кун-2023.-5 (55)-Р*: 613-618.

19. Sh, Yusupov Sh, and H. R. Ibrakhimova. "IMMUNOLOGICAL CHARACTERISTICS OF PATIENTS WHOSE BODY IS INFECTED WITH CATTLE SOLITAIRE." *Новости образования: исследование в XXI веке* 2.15 (2023): 120-124.

20. Oblokulov, A., Kholov, U., Oblokulova, Z., & Ibrakhimova, X. (2019). Clinical and laboratory characteristics of giardiasis in adults. *New day in medicine. Scientific and practical journal*, *1*(1).

21. Ибрахимова Хамида Рустамовна, Нурллаев Руслон Рустамбекович, & Артиков Икром Ахмеджанович (2019). Влияние паразитарных болезней на особенности развития туберкулеза у детей, проживающих в Хорезмской области. Наука, техника и образование, (9 (62)), 68-72.

22. Ibraximova , H., Mo’minov , I., & Niyazmetov , T. (2025). OVQATLANISH VA IMMUNITET. *Journal of Science-Innovative Research in Uzbekistan*, *3*(2), 134–138. Retrieved from https://inlibrary.uz/index.php/journal-science-innovative/article/view/65822

23. Rustamovna, Ibrakhimova H. "Degree of Clinical Symptoms in Children with Parasitic Diseases." *Galaxy International Interdisciplinary Research Journal*, vol. 10, no. 10, 13 Oct. 2022, pp. 273-277.

24. BASICS OF PREVENTING PARASITIC INFECTIONS AMONG CHILDREN. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(2), 306-310. https://www.mjstjournal.com/index.php/mjst/article/view/2630

25. Ҳамида Рустамовна Ибрахимова (2022). ПАРАЗИТАР КАСАЛЛИКЛАР ТАШҲИСЛАНГАН ТУРЛИ ЁШДАГИ ОДАМЛАРДА ИММУН СТАТУСИГА ТАВСИФ. Academic research in educational sciences, 3 (4), 812-819. doi: 10.24412/2181-1

26. Ibrakhimova, H. R., & Artikov, I. A. (2023). CHANGES IN THE IMMUNE STATUS OF PATIENTS WITH PARASITIC DISEASE. *Новости образования: исследование в XXI веке*, *2*(15), 103-108.

27. Ибрахимова, Х. Р., & Облокулов, А. Р. (2019). Современный взгляд на распространенность и патогенетические аспекты паразитарных заболеваний у детей. *Новый день в медицине*, *1*(25), 30-34.-2022-4-812-819

28. Sh, Yusupov Sh, and H. R. Ibrakhimova. "IMMUNOLOGICAL CHARACTERISTICS OF PATIENTS WHOSE BODY IS INFECTED WITH CATTLE SOLITAIRE." *Новости образования: исследование в XXI веке* 2.15 (2023): 120-124.

29. THE EFFECT OF PROPER NUTRITION ON IMMUNITY IN CHILDREN. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(6), 1229-1233. https://www.mjstjournal.com/index.php/mjst/article/view/4121

30. EPIDEMIOLOGY OF EXANTHEMIC DISEASES AMONG THE POPULATION OF KHOREZM. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(5), 66-71. https://mjstjournal.com/index.php/mjst/article/view/3370

31. HELMINTH INFECTIONS: CLASSIFICATION, DEVELOPMENTAL CONDITIONS, AND CLINICAL MANIFESTATIONS. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(6), 1241-1245. https://mjstjournal.com/index.php/mjst/article/view/4123

32. ROTAVIRUS INFECTION AMONG CHILDREN: TRANSMISSION, RISKS AND PREVENTIVE MEASURES. (2025). *Multidisciplinary Journal of Science and Technology*, *5*(6), 225-230. https://mjstjournal.com/index.php/mjst/article/view/3929

33. Машарипова, Ш. С., & Машарипов, С. М. (2026). ЭПИДЕМИОЛОГИЯ ВНУТРИБОЛЬНИЧНЫХ ИНФЕКЦИЙ: РАСПРОСТРАНЁННОСТЬ, ФАКТОРЫ РИСКА И ПРОФИЛАКТИКА. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *85*(2), 237-245.

34. Raximboyevich, Y. S., Rustamovna, I. H., & Sabirovna, M. S. (2025). ROTAVIRUS INFECTION AMONG CHILDREN: TRANSMISSION, RISKS AND PREVENTIVE MEASURES. *Multidisciplinary Journal of Science and Technology*, *5*(6), 225-230.

35. Машарипова, Ш. С., Матякубова, О. У., Абдуллаева, Д. К., & Ибодуллаева, С. С. (2025). КЛИНИЧЕСКИЕ И ИММУНОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ИНФЕКЦИОННОГО МОНОНУКЛЕОЗА У ДЕТЕЙ. *Multidisciplinary Journal of Science and Technology*, *5*(6), 249-256.

36. Аскарова Роза Исмаиловна, Атажанов Шамсиддин Зарифбаевич, Маткурбанов Хамдамбек Илхамбекович Анализ первичных форм туберкулеза у детей, проживающих в Хорезмской области // Наука, техника и образование. 2019. №9 (62). URL: https://cyberleninka.ru/article/n/analiz-pervichnyh-form-tuberkuleza-u-detey-prozhivayuschih-v-horezmskoy-oblasti (дата обращения: 09.02.2026).

37. Отажанов Ш. З., Худайцулова Г. К., Муминова М. Т. THE COURSE OF DIARRHEA OF VIRAL ETIOLOGY IN HIV INFECTED CHILDREN //Новый день в медицине. – 2019. – №. 4. – С. 252-255.

38. Ibraximova H. R., Artiqov I. A., Otajanov Sh Z. HELMINTH INFECTIONS: CLASSIFICATION, DEVELOPMENTAL CONDITIONS, AND

CLINICAL MANIFESTATIONS //Multidisciplinary Journal of Science and Technology. – 2025. – Т. 5. – №. 6. – С. 1241-1245.

39. Аскарова Роза Исмаиловна, Атажанов Шамсиддин Зарифбаевич, & Маткурбанов Хамдамбек Илхамбекович (2019). Анализ первичных форм туберкулеза у детей, проживающих в Хорезмской области. Наука, техника и образование, (9 (62)), 64-68.

40. Ibraximova H. R. et al. CLINICAL IMMUNOLOGICAL ALTERATIONS IN ENTEROBIASIS: A COMPREHENSIVE REVIEW //Shokh Articles Library. – 2026. – Т. 1. – №. 1.