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# Temporal Trends of Viral Hepatitis B and C: A 10-Month Retrospective Study from Healthcare Facility Data

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## ABSTRACT

**Purpose:** Viral hepatitis remains a significant public health concern in Libya, with hepatitis B virus (HBV) and hepatitis C virus (HCV) infections contributing to the burden of chronic liver disease. This study aimed to analyze temporal trends and demographic patterns of viral hepatitis B and C cases from healthcare facilities in Zawiya, Libya, during January–October 2024.

**Materials and Methods:** A retrospective analysis was conducted using surveillance data from multiple healthcare facilities across Zawiya municipality. Data included hepatitis type, reporting date, age, gender, and facility location. Descriptive statistics were used to analyze case distribution across the study period.

**Results:** A total of 133 cases were reported, comprising 91 hepatitis B (68.4%) and 42 hepatitis C (31.6%). Both infections showed male predominance (HBV: 75.8% male; HCV: 78.6% male). Hepatitis B peaked in May (n=20), while hepatitis C peaked in August (n=8) and October (n=7). The majority were concentrated in central Zawiya facilities, with the highest burden among those aged 20–40 years.

**Conclusion:** This study reveals continued burden of viral hepatitis B and C in Zawiya, with HBV representing two-thirds of cases. The male predominance and age distribution are consistent with regional trends. Enhanced surveillance, prevention strategies, and vaccination remain essential to reduce hepatitis burden. (*Open J Biomed Res 2026;5:72-77*)

**Keywords:** Viral hepatitis, Hepatitis B, Hepatitis C, Epidemiology, Public health.

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AUDIOABSTRACT

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## INTRODUCTION

Viral hepatitis represents one of the most significant global public health challenges, with an estimated 354 million people worldwide living with chronic hepatitis B or C infections.[1] These infections are responsible for substantial morbidity and mortality, primarily through the progression to chronic hepatitis, cirrhosis, and hepatocellular carcinoma.[1,2] The World Health Organization has established ambitious targets for the elimination of viral hepatitis as a public health threat by 2030, emphasizing the importance of comprehensive surveillance and prevention strategies.[1,3]

In the North African region, and particularly in Libya, viral hepatitis continues to pose considerable public health concerns. Previous national seroepidemiological surveys conducted

in Libya have reported hepatitis B surface antigen (HBsAg) prevalence of approximately 2.2% among the general population,[4] while hepatitis C antibody prevalence was estimated at 1.2%.[5] These figures place Libya in the intermediate endemicity category for viral hepatitis, necessitating sustained public health interventions.[4-6]

The epidemiology of viral hepatitis in Libya reflects a complex interplay of factors including perinatal transmission, healthcare-associated exposures, and community transmission patterns.[4,5] The higher prevalence of HBV compared to HCV in the Libyan population has been attributed to perinatal and early childhood transmission, as well as variable vaccination coverage among different age cohorts.[4,7] The predominance of HBV genotype D and HCV genotype 4 in Libya aligns with regional molecular epidemiological patterns observed across North Africa and the Middle East.[8-10]

Zawiya, located in northwestern Libya, represents an important urban center with a significant population and multiple healthcare facilities. Understanding the local epidemiology of viral hepatitis in this region is essential for informing public health policy and resource allocation.[6] This study provides a comprehensive analysis of acute hepatitis B and C cases reported from healthcare facilities in Zawiya during the first ten months of 2024, offering insights into temporal trends, demographic patterns, and disease distribution.

## MATERIALS AND METHODS

### Study Design and Setting

This retrospective study analyzed surveillance data collected from healthcare facilities across Zawiya municipality in Libya. The study period encompassed January 1, 2024, through October 31, 2024, providing a 10-month observation window for trend analysis.

### Data Collection

Data were extracted from routine infectious disease surveillance reports submitted by healthcare facilities to the municipal health authorities. The surveillance system captures information on reportable infectious diseases, including acute viral hepatitis B and C. Variables extracted for analysis included the type of hepatitis (B or C), date of reporting, patient age, gender, and healthcare facility location.

### Case Definitions

Cases were classified according to standard diagnostic criteria for acute viral hepatitis (5). Hepatitis B cases were identified based on positive hepatitis B surface antigen (HBsAg) detection with compatible clinical presentation. Hepatitis C cases were defined by positive anti-HCV antibody testing with or without confirmatory HCV RNA detection.

### Statistical Analysis

Descriptive statistical methods were employed to analyze the distribution of cases. Frequencies and percentages were calculated for categorical variables, including gender and age group distributions. Monthly case counts were analyzed to identify temporal trends. The analysis was conducted using standard data analysis software, with results presented as summary statistics and frequency distribution.

## RESULTS

### Overall Case Distribution

During the 10-month study period, a total of 133 cases of acute viral hepatitis were reported from healthcare facilities in Zawiya. Hepatitis B accounted for 91 cases (68.4% of total), while hepatitis C comprised 42 cases (31.6% of total). This distribution indicates a substantially higher burden of HBV infection compared to HCV in the study population.

### Temporal Trends

The monthly distribution of hepatitis cases revealed notable temporal patterns. For hepatitis B, the highest number of cases was reported in May (n=20), followed by August

(n=14), February (n=11), and October (n=10). The lowest number of HBV cases was observed in July (n=0). The temporal pattern for hepatitis C differed somewhat, with peaks occurring in August (n=8) and October (n=7), while June and July reported minimal cases (n=2 and n=0, respectively). Table 1 presents the monthly distribution of hepatitis B and C cases during the study period.

**Table 1:** Monthly distribution of viral hepatitis cases (January–October 2024).

| Month | Hepatitis B Cases | Hepatitis C Cases | Total Cases |
|---|---|---|---|
| January | 10 | 5 | 15 |
| February | 11 | 4 | 15 |
| March | 5 | 4 | 9 |
| April | 10 | 4 | 14 |
| May | 20 | 4 | 24 |
| June | 6 | 2 | 8 |
| July | 0 | 0 | 0 |
| August | 14 | 8 | 22 |
| September | 5 | 4 | 9 |
| October | 10 | 7 | 17 |
| **Total** | **91** | **42** | **133** |

### *Gender Distribution*

Analysis of gender distribution revealed a consistent male predominance for both types of viral hepatitis. Among hepatitis B cases, 69 cases (75.8%) occurred in males compared to 22 cases (24.2%) in females. Similarly, hepatitis C cases showed a male predominance with 33 cases (78.6%) in males versus 9 cases (21.4%) in females. The male-to-female ratio was approximately 3:1 for both HBV and HCV infections.

### *Age Distribution*

The age distribution of hepatitis cases varied between the two viral types. For hepatitis B, the highest number of cases was observed in the 20-25 and 35-40 age groups (18 cases each), followed by the 30-35 age group (15 cases), and the 25-30 and 45-50 age groups (12 cases each). Cases in younger age groups (<15 years) were relatively uncommon.

For hepatitis C, a different age pattern emerged, with the highest burden observed in the 45-50 age group (17 cases), followed by the 20-25 age group (8 cases). The 40-45 age group accounted for 6 cases, while other age groups had fewer cases. (Table 2) summarizes the age distribution of hepatitis B and C cases.

### *Healthcare Facility Distribution*

The distribution of cases across healthcare facilities indicated concentration in central Zawiya facilities. The Zawiya Central facility reported the highest number of hepatitis B cases across multiple months, with particularly high counts in May (n=20), August (n=14), and February (n=11). Hepatitis C cases were similarly concentrated in the central facilities, with peaks in August (n=8) and October (n=7).

## DISCUSSION

This retrospective analysis of viral hepatitis surveillance data from Zawiya, Libya, reveals important patterns in the epidemiology of hepatitis B and C infections during the first ten months of 2024. The findings contribute to our understanding of the local disease burden and

inform public health planning for hepatitis control and elimination efforts,[1,6]

The observed predominance of hepatitis B over hepatitis C in this study aligns with previous epidemiological investigations conducted in Libya. National surveys have consistently reported higher HBV prevalence compared to HCV in the general population.[4,5] The approximately 2:1 ratio of HBV to HCV cases observed in Zawiya is consistent with regional patterns and reflects the different transmission dynamics of these viruses.[4,5,11] HBV transmission in Libya occurs primarily through perinatal and early childhood exposure, while HCV transmission has historically been associated with healthcare-related exposures and blood transfusions prior to systematic screening implementation.[5,11,12]

**Table 2:** Age Distribution of Viral Hepatitis Cases.

| Age Group (years) | Hepatitis B Cases | Hepatitis C Cases |
|---|---|---|
| <5 | 0 | 0 |
| 5-10 | 0 | 1 |
| 10-15 | 4 | 1 |
| 15-20 | 8 | 4 |
| 20-25 | 18 | 8 |
| 25-30 | 12 | 1 |
| 30-35 | 15 | 3 |
| 35-40 | 18 | 1 |
| 40-45 | 4 | 6 |
| 45-50 | 12 | 17 |

The male predominance observed for both HBV and HCV infections in this study is consistent with findings from previous research in Libya and the broader North African region.[8] The 3:1 male-to-female ratio for both viral hepatitis types suggests differential exposure patterns, potentially related to occupational exposures, healthcare-seeking behaviors, or biological factors affecting disease progression and diagnosis.[8] Similar gender distributions have been reported in studies from other parts of Libya, where male patients demonstrated higher seroprevalence rates for both HBV and HCV infections.[8]

The temporal trends observed in this study, with peaks in May and August for hepatitis B and in August and October for hepatitis C, may reflect seasonal variations in disease transmission, diagnostic practices, or reporting patterns. The absence of reported cases in July across both hepatitis types is notable and may indicate reporting disruptions, reduced healthcare utilization during this period, or genuine seasonal variation in disease incidence.

The age distribution patterns observed in this study provide insights into the epidemiology of viral hepatitis in Zawiya. For hepatitis B, the concentration of cases in young adults (20-40 years) is consistent with the natural history of HBV infection, where chronically infected individuals may present with acute exacerbations or complications during adulthood.[1,7] The relatively low number of cases in children may reflect the success of childhood vaccination programs implemented in Libya, which have been shown to reduce HBV transmission among younger cohorts.[7,13]

The different age pattern observed for hepatitis C, with a peak in the 45-50 age group, is consistent with historical transmission patterns related to healthcare exposures and blood transfusions prior to the implementation

of universal screening.[5,11] As Libya has made progress in blood safety and infection control practices, HCV transmission has declined, resulting in an aging cohort of infected individuals.[3,11]

The concentration of cases in central Zawiya healthcare facilities reflects both population density and healthcare accessibility patterns. The central facilities serve as referral centers and are likely to capture cases from surrounding areas, potentially influencing the observed distribution.

In the context of global and regional hepatitis elimination goals, these findings underscore the continued need for comprehensive hepatitis control strategies in Libya. The World Health Organization's Global Hepatitis Strategy targets a 90% reduction in new chronic hepatitis B and C infections and a 65% reduction in mortality by 2030.[1,3] Achieving these targets in Libya will require sustained efforts in vaccination, screening, treatment, and surveillance.[1,3,6] The rising incidence of liver cancer across the Middle East and North Africa region, driven significantly by underlying viral hepatitis infections, further emphasizes the urgency of these interventions.[2]

The findings of this study should be interpreted in light of several limitations. As a retrospective analysis of surveillance data, the study is subject to the inherent limitations of passive reporting systems, including potential underreporting, incomplete data, and variability in diagnostic practices across facilities.[14,15] The study period of ten months provides a limited window for assessing seasonal trends and long-term patterns. Additionally, the data do not distinguish between acute and chronic infections or capture outcomes such as disease progression or mortality.

Despite these limitations, this study provides valuable insights into the current epidemiology of viral hepatitis in Zawiya, Libya. The findings can inform targeted interventions, resource allocation, and public health planning to reduce the burden of viral hepatitis in this region. Continued surveillance and expanded screening programs are essential for monitoring progress toward hepatitis elimination goals and ensuring that control efforts are evidence-based and effective.[3,6]

## CONCLUSION

This retrospective study of viral hepatitis surveillance data from Zawiya, Libya, demonstrates a continued substantial burden of hepatitis B and C infections in the region. Hepatitis B accounted for approximately two-thirds of reported cases, with a consistent male predominance and concentration among young adults. The temporal and demographic patterns observed align with regional epidemiological trends and inform public health priorities for hepatitis control.

The findings underscore the importance of maintaining and strengthening hepatitis prevention and control programs in Libya, including vaccination initiatives, screening programs, and access to treatment. As the global community works toward the elimination of viral hepatitis as a public health threat by 2030, local epidemiological data such as those presented in this study are essential for guiding targeted interventions and monitoring progress toward this ambitious goal.

## Conflicts of Interest

The authors declare no conflicts of interest.

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