Proceeding Paper

The Epidemiology of Hepatitis in the Marche Region (Italy): A Notification System over a Decade (2012–2021) [†]

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Abstract: The World Health Organization has highlighted the substantial impact of viral hepatitis on individuals, healthcare systems, and economies worldwide. This study's objective is to monitor disease notifications to assess their trends. Data from infectious disease notifications detected in the Marche Region (Italy) were analyzed and entered into the Nuovo Sistema Informativo Sanitario portal between 1 January 2012 and 31 December 2021. In this period, there were 399 confirmed reports, of which 47.9% were for hepatitis A, 26.8% were for hepatitis B, 7% were for hepatitis C, and 18.3% were for hepatitis E; 67.4% of the afflicted individuals were male, and the average age was 43.5 years old. The year with the highest peak was 2017, accounting for 18% of the reports, while the year with the lowest number was 2020, followed by 2021, accounting for 3.8% and 4.5%, respectively. Effective surveillance systems are key to combating the spread of hepatitis and reducing its impact, although they have been affected by the SARS-CoV-2 pandemic, with many cases remaining undetected.

Keywords: viral hepatitis; infectious diseases; notification system

1. Introduction

Viral hepatitis is a major global health problem, affecting an estimated 290 million people worldwide [1]. The World Health Organization (WHO) has highlighted the substantial impact of viral hepatitis on individuals, healthcare systems, and economies [2]. There are five main types of viral hepatitis: A, B, C, D, and E. Hepatitis A and E are typically transmitted through the fecal–oral route, while hepatitis B, C, and D are transmitted through blood or body fluids. As of December 31, 2023, in Italy, the predominant routes of hepatitis A transmission were identified as the consumption of raw or undercooked shellfish (35.5%) and travel to endemic areas (31.9%). Hepatitis B was most frequently contracted through beauty treatments, such as manicures, piercings, and tattoos (38%), followed by dental treatments (28.7%). For hepatitis E, over half of the reported cases (53.1%) were linked to the consumption of raw or undercooked pork. Additionally, beauty treatments, including manicures, pedicures, piercings, and tattoos, accounted for 40.4% of hepatitis C transmissions [3]. Hepatitis A and E usually cause acute infections that resolve on their own, but hepatitis B, C, and D infections can become chronic and lead to serious liver damage, including cirrhosis and liver cancer [4]. Hepatitis B (HBV) infection stands as the primary contributor to chronic liver disease on a global scale, impacting a staggering 257 million individuals worldwide. This viral infection plays a pivotal role in approximately 54% of hepatocellular carcinoma (HCC) cases [5]. The initial worldwide hepatitis report, published in 2017, revealed that in the year 2015, the consequences of viral hepatitis

infection resulted in the deaths of 1.4 million individuals [2]. The overwhelming majority of deaths, accounting for over 90%, were attributed to cirrhosis and HCC, both of which are outcomes of chronic hepatitis B (CHB) and chronic hepatitis C (CHC) infections [6]. In 2015, the United Nations passed a resolution that advocated for the development of targeted measures to address viral hepatitis as an integral component of the Agenda for Achieving Sustainable Development Goals by 2030. Subsequently, in 2016, the World Health Organization introduced its global hepatitis strategy, endorsed by all WHO Member States, that aims to reduce new hepatitis infections by 90% and deaths by 65% between 2016 and 2030 [7,8]. This study's objective is to monitor hepatitis notifications in the Marche Region, Italy, to assess their trends, assuming temporal trends and seasonality. It is important to note that the observation and study period coincided with the COVID-19 pandemic, during which surveillance systems were often neglected. Therefore, this study also considers whether the COVID-19 pandemic influenced the trend of hepatitis notifications.

2. Materials and Methods

Data from infectious disease notifications issued in the Marche Region (Italy) were analyzed and entered into the New Health Information System (NSIS) portal between 1 January 2012 and 31 December 2021. The Marche region is a part of Central Italy. It is located in the Adriatic–Ionian Region, and its total resident population, as of 1 January 2022, is 1,487,150 inhabitants [9]. The NSIS represents the reference tool for quality, efficiency, and appropriateness measures of the National Health Service (SSN). This function is made possible through the availability of information that, due to its completeness, consistency, and timeliness, supports the regions and the ministry in the exercise of their functions, particularly supporting the ministry in its role as guarantor of the uniform application of the Essential Levels of Care (Livelli Essenziali di Assistenza—LEA) throughout the country [10]. The NSIS was created, therefore, with the aim of making available, at a national and regional level, a wealth of data, rules, and methodologies for measuring quality, efficiency, appropriateness, and cost to support the governance of the SSN and the monitoring of LEA and health expenditure, shared among the various institutional levels and centered on the citizen [10]. For each patient, gender, age, nationality, reporting province, reporting facility, and type of infectious disease were recorded. Data were recorded anonymously, and the identity of the patients cannot be traced. Analyses have been performed with Microsoft Excel 16.77.1.

3. Results

Our study sample included 399 confirmed reports, of which 47.9% (n = 191) were for hepatitis A, 26.8% (n = 107) were for hepatitis B, 7.0% (n = 28) were for hepatitis C, and 18.3% (n = 73) were for hepatitis E. Table 1 In the case of hepatitis A infections, 61.3% (n = 117) of the cases were males, and 94.2% (n = 180) were of Italian nationality, with a mean age of 36.7 years. For hepatitis B, 74.7% (n = 81) were males, 93.5% (n = 100) were of Italian nationality, and the mean age was 51.1 years. For hepatitis C, 64.3% (n = 18) were males, 96.4% (n = 27) were of Italian nationality, and the mean age was 44.7 years. Lastly, for hepatitis E, 72.6% (n = 53) were males, 98.6% (n = 72) were of Italian nationality, and the mean age was 56.1 years. These findings are shown in Table 1.

For all four types of hepatitis, the origin of the alert is mainly the hospital, with values of 81.7% (n = 156) for hepatitis A, 93.5% (n = 100) for hepatitis B, 67.9% (n = 19) for hepatitis C, and 87.7% (n = 64) for hepatitis E (Table 2).

Regarding the reporting provinces, there is no homogeneity of reporting either geographically or in terms of infection (Table 2).

Overall, the year with the most notifications of cases was 2017, accounting for 18% of the total reports, while the year with the lowest number of notifications was 2020, followed by 2021, with 3.8% and 4.5%, respectively (Figure 1).

Table 1. Descriptive analysis of patients' characteristics.

	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis E
Gender	n (%)	n (%)	n (%)	n (%)
Male	117 (61.3)	81 (75.7)	18 (64.3)	53 (72.6)
Female	74 (38.7)	26 (24.3)	10 (35.7)	20 (27.4)
Nationality				
Italian	180 (94.2)	100 (93.5)	27 (96.4)	72 (98.6)
Other	11 (5.8)	7 (6.5)	1 (3.6)	1 (1.4)
Total	191 (47.9)	107 (26.8)	28 (7.0)	73 (18.3)
Mean Age (years)	36.7	50.1	44.7	56.1

Table 2. Descriptive analysis of alerts' origins.

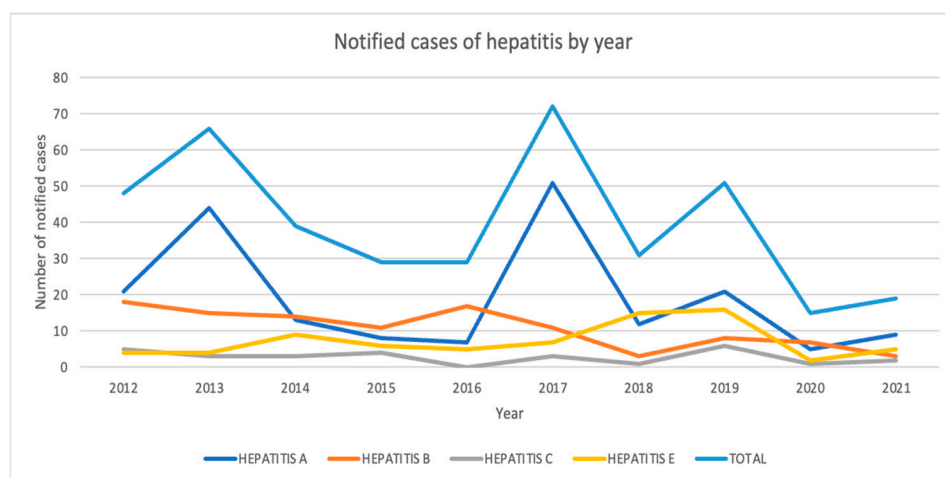|	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis E
Facility	n (%)	n (%)	n (%)	n (%)
Hospital	156 (81.7)	100 (93.5)	19 (67.9)	64 (87.7)
Healthcare District	35 (18.3)	7 (6.5)	9 (32.1)	9 (12.3)
Province				
Pesaro Urbino	45 (23.6)	44 (41.1)	7 (25.0)	7 (9.6)
Ancona	62 (32.5)	28 (26.2)	4 (14.3)	32 (43.8)
Macerata	54 (28.3)	20 (18.7)	11 (39.3)	17 (23.3)
Fermo	18 (9.4)	12 (11.2)	2 (7.1)	10 (13.7)
Ascoli Piceno	12 (6.3)	3 (2.8)	4 (14.3)	7 (9.6)

Figure 1. Incidence of viral hepatitis notifications in the Marche Region (Italy) from 2012 to 2021.

The total number of notified cases tends to follow the rise and fall of case of hepatitis A cases, which are the most numerous and present the highest magnitude of change (Figure 1).

4. Discussion

Our study focused on monitoring hepatitis notifications to evaluate their characteristics and trends. In alignment with national epidemiological data [11], our findings indicate a higher incidence of hepatitis among men for both total and specific infections. Notably, the number of notified cases of hepatitis A experienced peaks in 2013 and 2017, attributed to outbreaks linked to mixed frozen berries in 2013 and an outbreak among men who have sex with men (MSM) following the pride festival in 2016 [12,13]. The implementation of mandatory hepatitis B vaccination for newborns and 12-year-old children (born in 1980) in

Italy in 1991 under Law 165/1991 could have contributed to the higher mean age of notified hepatitis B cases [14]. Regarding hepatitis E, an increase in cases between 2018 and 2019 was documented in central Italy in Garbuglia et al.'s study on an outbreak [15]. The sharp decline in hepatitis cases in 2020 can be attributed to the SARS-CoV-2 pandemic, resulting in underreporting of infectious diseases across the board [16]. Furthermore, the majority of notifications originated from hospital settings, underscoring that new diagnoses are more frequent in hospitals where the serological statuses of patients are more frequently investigated to navigate various differential diagnoses.

The strengths of this study are as follows: obtaining data from the Nuovo Sistema Informativo Sanitario portal ensured a robust dataset, which enhanced the reliability of the trend analysis, and covering a decade allowed for the observation of long-term trends and the effectiveness of intervention strategies over time.

However, the limitations of this study must be acknowledged. There is a potential issue regarding data completeness, which could lead to an underestimation of the true incidence of hepatitis in the Marche Region. The lack of detailed information on the vaccination statuses, comorbidities, and other medical histories of the patients could impede a comprehensive understanding of the affected populations. Furthermore, including data on the patients' countries of residence or travel history could provide valuable insights into distinguishing between imported and locally acquired infections.

5. Conclusions

The data analyzed highlight the need for targeted prevention strategies, screening programs for at-risk populations, advancements in diagnostics and therapeutics to provide effective treatment options, and ongoing efforts towards achieving elimination targets. In 2023, the Marche Region began actively promoting a hepatitis C screening campaign for individuals born between 1969 and 1989. Data from this campaign will provide a more accurate picture of hepatitis C serological status in Marche's population.

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