

RETROSPECTIVE ANALYSIS OF HEPATITIS A, B, AND C SEROPREVALENCE AMONG PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT

Acil Servise Müracaat Eden Hastaların Hepatit A, B ve C Seroprevalansinin Retrospektif Analizi

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ABSTRACT

Objective: Viral hepatitis is a significant infection that causes high morbidity and mortality worldwide. The World Health Organization (WHO) aims to eliminate hepatitis B (HBV) and hepatitis C (HCV) by 2030. Turkey has moderate endemicity for HBV and low prevalence for HCV. Emergency departments play a strategic role in identifying both acute hepatitis cases and undiagnosed carriers.

Material and Methods: Between January 2020 and December 2024, 4,687 patients who underwent at least one serological test for hepatitis A, B, or C at the Emergency Department of Balıkesir University Faculty of Medicine Hospital were retrospectively reviewed. The inclusion criterion was that hepatitis serology was requested at the time of presentation. Incomplete or duplicate records were excluded. Demographic data, reasons for presentation, and laboratory results were obtained from hospital records. Tests were performed using the ELISA method. Statistical analysis was performed using SPSS 26.0, with $p < 0.05$ considered statistically significant.

Results: A total of 19100 test results were evaluated. Anti-HAV IgG (59.9%) and Anti-HBs (43.9%) had the highest positivity rates. Active infection markers (Anti-HAV IgM, Anti-HBc IgM, Anti-HCV, HBsAg) were detected in less than 1% of cases. The most common reasons for presentation were bleeding (48.4%), pregnancy-related complaints (23.9%), and falls (13.8%). Seasonally, the highest number of presentations occurred in the fall. 52.1% of patients were discharged, while 47.9% were admitted to Obstetrics, Orthopedics, General Surgery, and Gastroenterology clinics.

Conclusion: The high level of immunity against HAV and HBV in Turkey reflects the success of vaccination programs. While the low rates of active infection present a positive picture, the small number of carriers detected highlights the importance of emergency department-based screening. Continuing widespread screening strategies in emergency departments may play a critical role in achieving viral hepatitis elimination goals.

Keywords: *Viral Hepatitis; Seroprevalence; Emergency Department; Hepatitis Screening*

ÖZET

Amaç: Viral hepatitler, dünya genelinde yüksek morbidite ve mortaliteye yol açan önemli enfeksiyonlardır. Dünya Sağlık Örgütü (DSÖ), 2030 yılına kadar hepatit B (HBV) ve hepatit C'yi (HCV) elimine etmeyi hedeflemektedir. Türkiye, HBV açısından orta düzey endemisitede, HCV açısından ise düşük prevalansa sahiptir. Acil servisler hem akut hepatit vakalarının hem de tanı almamış taşıyıcıların saptanmasında stratejik öneme sahiptir.

Gereç ve Yöntemler: Ocak 2020–Aralık 2024 arasında Balıkesir Üniversitesi Tıp Fakültesi Hastanesi Acil Servisi'nde hepatit A, B veya C'ye yönelik en az bir serolojik test yapılan 4.687 hasta retrospektif olarak incelendi. Dahil edilme kriteri, başvuru sırasında hepatit serolojisi istenmiş olmasıydı. Eksik veriler veya mükerrer kayıtlar dışlandı. Demografik veriler, başvuru nedenleri ve laboratuvar sonuçları hastane kayıtlarından elde edildi. Testler ELISA yöntemiyle çalışıldı. İstatistiksel analiz SPSS 26.0 ile yapıldı, $p < 0,05$ anlamlı kabul edildi.

Bulgular: Toplam 19100 test sonucu değerlendirildi. Anti-HAV IgG (%59,9) ve Anti-HBs (%43,9) en yüksek pozitiflik oranlarına sahipti. Aktif enfeksiyon belirteçleri (Anti-HAV IgM, Anti-HBc IgM, Anti-HCV, HBsAg) %1'in altında saptandı. En sık başvuru nedenleri kanama (%48,4), gebelikle ilişkili şikâyetler (%23,9) ve düşme (%13,8) idi. Mevsimsel olarak başvurular en çok sonbaharda gerçekleşti. Hastaların %52,1'i taburcu edildi, %47,9'u ise Kadın Doğum, Ortopedi, Genel Cerrahi ve Gastroenteroloji kliniklerine yatırıldı.

Sonuç: Türkiye'de HAV ve HBV'ye karşı yüksek bağışıklık düzeyi, aşılama programlarının başarısını yansıtmaktadır. Aktif enfeksiyon oranlarının düşük olması olumlu bir tablo sunarken, tespit edilen az sayıdaki taşıyıcı, acil servis tabanlı taramaların önemini ortaya koymaktadır. Acil servislerde yaygın tarama stratejilerinin sürdürülmesi, viral hepatit eliminasyon hedeflerine ulaşmada kritik rol oynayabilir.

Anahtar Kelimeler: *Viral Hepatit; Seroprevalans; Acil Servis; Hepatit Taraması*

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INTRODUCTION

Viral hepatitis is a major infectious disease that causes high morbidity and mortality worldwide. Approximately 1.3 million people die each year from this disease, with 83% of these deaths attributable to hepatitis B and 17% to hepatitis C (1). Therefore, the World Health Organization (WHO) has designated viral hepatitis as a global public health issue and aims to eliminate hepatitis B and C by 2030.

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are clinically significant due to their potential to cause acute hepatitis, as well as chronic liver disease, cirrhosis, and hepatocellular carcinoma, which are life-threatening complications (2). HBV is a DNA virus that can be transmitted through various routes, primarily perinatal transmission and blood. Less than 5% of HBV infections acquired in adulthood become chronic, while approximately 90% of infections acquired in infancy become chronic (3). HCV is an RNA virus transmitted through blood and body fluids, with chronic infection developing in the majority of infected individuals (4). While effective vaccines and antiviral treatments are available for HBV, direct-acting oral antiviral agents can achieve a cure rate of 95–98% in HCV infections (5).

However, diagnosis rates for both HBV and HCV infections are low; only 13% of HBV carriers and 36% of HCV carriers worldwide are aware of their infection (6). Low awareness and the often asymptomatic course of the disease lead to a significant proportion of cases remaining undiagnosed (7). Despite the development of antiviral treatment options and the expansion of vaccination programs, hepatitis B and C remain leading causes of morbidity and mortality on a global scale (8). Hepatitis A virus (HAV) is primarily transmitted through the fecal-oral route and typically causes acute hepatitis (9). Infection usually occurs during childhood through contaminated water or food, does not become chronic, and results in complete recovery in most cases; however, it can rarely lead to fulminant hepatitis (10). The mortality rate of hepatitis A, which is widespread globally, is considerably lower than that of hepatitis B and C. With the widespread use of effective vaccines and improvements in sanitation, the incidence of the disease has decreased significantly, especially in developed countries (11).

Turkey is among the regions where viral hepatitis is

endemic due to its geographical and socioeconomic characteristics. Hepatitis B is seen at a moderate endemic level in our country, with approximately 4–5% of the adult population HBsAg positive (12). Studies conducted in Turkey have detected anti-HBc positivity in healthy blood donors, indicating that these individuals have been exposed to HBV in the past (13). It is estimated that the number of chronic hepatitis B carriers is high, but only a limited proportion of these individuals are aware of their condition (14).

Hepatitis C infection, on the other hand, has a lower prevalence in Turkey; the anti-HCV seroprevalence in the general population is approximately 1%, and it is estimated that there are nearly half a million individuals with chronic HCV (4). However, HCV infection can lead to serious clinical outcomes and is one of the leading causes of liver transplantation in regions such as Europe (15).

Emergency departments are an important point of contact for viral hepatitis. A significant proportion of acute hepatitis cases are caused by hepatitis B, followed by hepatitis A and C (16). Additionally, individuals with chronic viral hepatitis who are unaware of their condition may present to the emergency department with various complaints, and abnormal liver function tests may be incidentally detected during routine investigations (9). However, diagnosing viral hepatitis in the emergency department presents certain challenges. The nonspecific symptoms of acute hepatitis can be confused with other diseases, a significant proportion of patients may present with mild symptoms or be asymptomatic, and diagnosis may be missed in the early stages. In addition, the priority in emergency departments is to address the patient's presenting complaint, and serological tests may take time to return. Limited on-site testing capabilities and the fact that laboratory results are often available hours later make it difficult to establish a definitive diagnosis at the time of presentation (17). This situation may lead to the infection going undetected, particularly in patients who are discharged and do not return for follow-up.

Emergency departments are an important screening area for individuals with limited access to primary health care. Therefore, they play a critical role in identifying chronic hepatitis cases that cannot access

routine screening or remain outside the health system. The literature shows that screenings conducted in different healthcare settings have identified a significant number of previously undiagnosed HBV and HCV infections. In this context, the evaluation of viral hepatitis serology in the emergency department is of great importance for both accurately diagnosing acute cases and identifying silent infections to direct them toward treatment and prevention processes.

This study aims to retrospectively analyze the results of hepatitis A, B, and C serological tests conducted at the Emergency Department of Balikesir University Faculty of Medicine Hospital between January 2020 and December 2024 and to evaluate the prevalence of infection markers and their associations with clinical/laboratory characteristics in light of the literature.

MATERIAL AND METHOD

This study was designed as a retrospective, descriptive, and correlational research. The Emergency Department of Balikesir University Faculty of Medicine Hospital was selected as the study center. All patients who presented to the emergency department between January 2020 and December 2024 and for whom viral hepatitis serological tests were requested were included in the study. A total of 4687 patients with hepatitis markers were identified during the specified period. The entire population was examined without sample selection.

Inclusion criteria: All patients who had any serological test (e.g., HBsAg, anti-HBc IgM, anti-HCV, anti-HAV IgM) for hepatitis A, B, or C requested during their emergency department visit were included in the study.

Exclusion criteria: Patients whose medical records were unavailable, had incomplete laboratory results, or had duplicate visits were excluded from the study. To avoid duplication, only the first visit was considered for patients who had repeated tests during multiple visits.

Data were retrospectively obtained from the hospital automation system and the laboratory information management system. Demographic information (age, gender), presentation type (ambulance or self-presentation), presentation complaints, and clinical evaluation notes were retrieved from patient records. Viral hepatitis serological tests were performed using

ELISA-based methods in the hospital microbiology laboratory. The serological markers examined were as follows:

- Anti-HAV IgG
- Anti-HAV IgM
- Anti-HBc IgM
- Anti-HBs
- Anti-HCV
- HBsAg

Dependent variables were defined as viral hepatitis serology results (e.g., HBsAg positivity, presence of anti-HBc IgM, anti-HCV positivity, etc.). The diagnosis of acute viral hepatitis was based on laboratory criteria such as the presence of IgM-class antibodies specific to the relevant virus or HBsAg positivity. Independent variables were defined as age, gender, presentation type, and presenting complaints. Demographic and laboratory characteristics of patients with HBsAg or anti-HCV positivity were compared with those of the negative group to evaluate potential risk factors and clinical differences.

Data from a total of 19100 test results were analyzed. Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). The distribution characteristics of continuous variables were assessed using the Kolmogorov-Smirnov test. Data showing a normal distribution were summarized as mean \pm standard deviation. For two-group comparisons, Student's t-test was used for data meeting parametric conditions, and the Mann-Whitney U test was used for non-normally distributed data. Relationships between serological results and laboratory values were examined using correlation analysis. Statistical significance was set at $p < 0.05$.

The study was approved by the Ethics Committee for Clinical Research at Balikesir University (decision no: 2025/98, February 18, 2025). The study was conducted in accordance with the principles of the Helsinki Declaration and relevant national legislation. Patient confidentiality was maintained during the retrospective data collection process, and the obtained data were analyzed anonymously.

RESULTS

A total of 4687 patients who underwent viral hepatitis serological tests at the Emergency Department were

included in the study. When the gender distribution of the patients was evaluated, 2620 were female (55.9%) and 2067 were male (44.1%) (Figure 1).

The distribution of the total test results of the 4,687 patients included in the study, positivity rates, and their relationships with the presenting complaints were statistically analyzed. In the test-based evaluation, the highest positivity rates were found in the Anti-HBs (43.9%) and Anti-HAV IgG (59.9%) tests (Table 1).

When the distribution of patients according to their reasons for presentation was examined, the most common reason was bleeding, accounting for 9243 tests (48.4%) of all presentations. Bleeding complaints included various clinical conditions such as nosebleeds, vaginal bleeding, gastrointestinal bleeding, and blood loss following trauma. Second, patients presenting with pregnancy-related symptoms such as vaginal bleeding, abdominal pain, and threatened miscarriage accounted for 4558 tests (23.9%). Thirdly, patients evaluated with a preliminary diagnosis of fall were included, and the number of tests performed in this

group was determined as 2630 (13.8%) (Table 2).

When examining the seasonal distribution of the 4,687 patients included in the study, the highest admission rate was observed in the fall season (28%). This was followed by the summer season (28%), spring season (23%), and winter season (21%) (Figure 2).

When evaluating the final outcomes of patients according to the clinics where they were admitted, it was observed that the most common admission was to the Gynecology and Obstetrics Clinic (15.7%). This was followed by clinics in Orthopedics (10.8%), General Surgery (9.2%), and Gastroenterology (2.7%). The proportion of patients evaluated in the emergency department and discharged was determined to be 52.1% (Table 3).

In the serological test evaluation based on the reasons for application, the Anti-HAV IgG test stood out as the marker with the highest positivity rate. Positivity rates were found to be 60% in patients complaining of abdominal pain, 75% in those presenting with a fall, 22.2% in cases related to pregnancy, and 71.4% in those

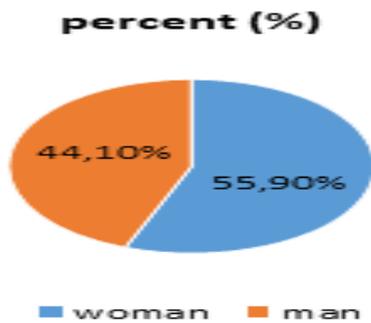


Figure 1. Gender distribution

Table 1. Distribution of results according to viral hepatitis and related serological tests (n=19,100)

Positive	Tests	Result		Total
		Negative		
	Anti-HAV IgG	173	116	289
	Anti-HAV IgM	5	827	832
	Anti-HBc IgM	5	3173	3178
	Anti-HBs	1570	2009	3579
	Anti-HCV	6	3743	3749
	HBsAg	2	3702	3724
Total		1781	17319	19100

Abbreviations: Anti-HAV IgG: Hepatitis A virus immunoglobulin G, Anti-HAV IgM: Hepatitis A virus immunoglobulin M, Anti-HBc IgM: Hepatitis B core antigen immunoglobulin M, Anti-HBs: Antibody to hepatitis B surface antigen, Anti-HCV: Antibody to hepatitis C virus, HBsAg: Hepatitis B surface antigen

Table 2. Distribution of patients by primary reason for emergency department admission

		Frequency	Percent
Valid	Abdominal pain	109	5.7
	Fall	2630	1
	Pregnancy-related complaints	4558	2
	General medical examination	1579	8
	Bleeding	9243	48.4
	Total	19100	10

Seasonal Distribution of Emergency Department Admissions Frequency

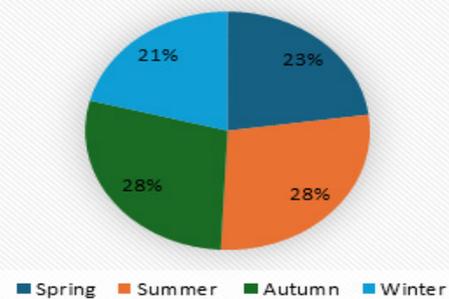


Figure 2. Seasonal distribution of emergency department admissions

presenting with bleeding complaints. Additionally, the Anti-HBs test was identified as another notable test, with positivity rates of 53.6% in the pregnancy-related complaints group, 72.6% in the general medical examination group, and 36.9% in patients presenting with bleeding (Table 4).

DISCUSSION

Viral hepatitis is one of the leading causes of morbidity and mortality worldwide, both in acute and chronic forms. The World Health Organization (WHO) has identified early diagnosis and increasing immunity levels as priority goals in its strategic plan to eliminate hepatitis B and C infections by 2030. In this context, emergency departments can play a critical role in identifying individuals with limited access to healthcare services or those who do not undergo routine screenings. Emergency department-based serological screenings are an important public health tool for reflecting the community's immunity profile and detecting asymptomatic infections.

This five-year retrospective analysis provides important data on the community's immunity level and infection prevalence by examining the results of viral hepatitis

serological tests requested in the emergency department.

The findings indicate a high level of immunity against Hepatitis A and B (18). The anti-HAV IgG positivity rate was 59.9% (173/289), indicating a high proportion of the population with immunity against Hepatitis A. The inclusion of Hepatitis A vaccine in the childhood vaccination schedule since 2012 and the fact that many individuals have previously experienced natural infection make this result expected. In the literature, Anti-HAV IgG seroprevalence in Turkey is generally reported to be moderate and to show regional variations (19). Our findings are consistent with this national trend. Similarly, Anti-HBs positivity was found to be 43.9% in our study. It is understood that the Hepatitis B vaccination program implemented since 1998 has provided widespread immunity in the general population (20). According to national data, Anti-HBs positivity in the adult population is generally between 30-40%, and this rate can reach up to 80% in groups such as young adults and healthcare workers (21). In our study, approximately half of the patients tested in the emergency department were Anti-HBs positive, indicating that a large proportion of this population

Table 3. Distribution of patients by hospital admission unit

Unit	Percent (%)
Emergency medicine	52.1
Obstetrics & gynecology	15
Orthopedics	10
General surgery	9
Gastroenterology	2.7

Table 4. Distribution of positivity rates by presenting complaint and test

Presenting complaint	Test name	Positivity rate (%)
Abdominal pain	Anti-HAV IgG	6
Fall	Anti-HAV IgG	75
Pregnancy-related complaints	Anti-HAV IgG	2
General medical examination	Anti-HAV IgG	51.7
Bleeding	Anti-HAV IgG	71.4
Pregnancy-related complaints	Anti-HBs	53.6
General medical examination	Anti-HBs	72.6
Bleeding	Anti-HBs	36.9

Abbreviations: Anti-HAV IgG: Hepatitis A virus immunoglobulin G, Anti-HBs: Antibody to hepatitis B surface antigen

has acquired immunity against HBV and reflecting the success of vaccination programs.

The positivity rates of serological markers indicating active infection or chronic carriage were found to be quite low in our study. Positivity rates for Anti-HAV IgM, Anti-HBc IgM, Anti-HCV, and HBsAg tests were below 1%. This finding suggests that acute hepatitis cases and chronic carriage are limited in the population. For example, Anti-HCV positivity was determined to be only 0.16%. Since Anti-HCV positivity in Turkey is reported to be around 0.5-1%, the rate in our study falls within the lower limit of this range (22). This low rate can be explained by the fact that screenings were largely conducted on asymptomatic individuals or during routine examinations. Similarly, HBsAg positivity was also detected below 1% in our study. This suggests that many individuals in the community who are carriers have not yet been diagnosed or have not come into contact with the healthcare system.

Therefore, emergency departments present an important opportunity to identify asymptomatic carriers. Indeed, the detection of a small number of HBsAg and Anti-HCV positive patients in our study highlights the public health value of screenings conducted in emergency departments. When evaluated together with high Anti-HAV IgG and Anti-HBs positivity rates, these results reflect the effectiveness of vaccination programs and demonstrate that emergency department-based serological screening contributes significantly to the detection of hidden infections in the community.

The findings of our study are generally consistent with international data and indicate that viral hepatitis is at a "moderate endemicity" level in Turkey (23). The low rates of acute infection and high levels of immunity reflect both the success of vaccination programs and the traces of past infections in the community.

For example, large-scale screenings conducted in emergency departments in the United States reported Anti-HCV positivity rates as high as 6-9%, although these rates varied according to risk factors such as age group and intravenous drug use (24). Lower rates have been reported in Europe. In Barcelona, Spain, a study conducted in an emergency department with universal screening found HBsAg positivity at 0.5% and HCV-RNA positivity at 0.7% (25). A similar study in the United

Kingdom reported an HBsAg positivity rate of 0.9% (26).

As can be seen, the 0.16% Anti-HCV and <1% HBsAg rates in our study are closely similar to European data. This parallelism supports the effectiveness of universal screening programs in emergency departments in identifying asymptomatic carriers. Indeed, it has been reported that screening strategies targeting risk groups may overlook a significant proportion of infected individuals, whereas universal screening approaches increase the detection rate of new cases. Experiences in the US and Europe indicate that universal hepatitis screening in emergency departments is successful in diagnosing individuals who cannot be identified using traditional risk-based methods (26). Therefore, emergency departments are considered to have a strategic role to play in the elimination of viral hepatitis from the community (27).

In our study, when the reasons for presenting to the emergency department were examined, it was observed that the patient profile was widely varied. The most common reason for presentation was bleeding (48.4%), which included various clinical presentations such as nosebleeds, gastrointestinal bleeding, trauma-related external bleeding, and gynecological/vaginal bleeding. Second, pregnancy-related complaints (23.9%) were the most common reason, with patients in this group primarily consisting of women of childbearing age who were evaluated in the emergency department before being referred directly to the obstetrics clinic. Third, patients presenting with falls (13.8%) are examined primarily for trauma-related extremity fractures or head trauma. Fourth, individuals presenting without any symptoms for general health screening or general medical examination (8.3%) are included. Lastly, patients presenting with abdominal pain and receiving a preliminary diagnosis of acute appendicitis (5.7%) are included in the final category.

The fact that bleeding complaints rank first among emergency department visits may be related to the center where the study was conducted being a tertiary university hospital and providing simultaneous services to multiple specialties. In the literature, trauma, abdominal pain, and chest pain are among the most common reasons for emergency department visits; however, it has been reported that the rate of bleeding

and obstetric-related visits increases significantly in centers integrated with obstetrics and trauma clinics (28). Indeed, the coordinated services provided with the obstetrics clinic at our center have contributed to this trend being reflected in the statistics.

Another notable finding in our study is that the rates of viral hepatitis testing requests vary according to the reasons for referral. For example, it is thought that hepatitis tests are more frequently requested in patients presenting with bleeding for prophylaxis prior to surgical intervention or to rule out potential systemic causes. Similarly, in cases related to pregnancy, viral hepatitis screening becomes a priority for both maternal and fetal health. The literature also emphasizes the importance of screening for HBV and HCV serology in pregnant women during the prenatal period and notes that pregnancy offers a critical opportunity for detecting these infections. Therefore, in our study, patients presenting with bleeding and obstetric reasons formed groups with higher rates of viral serological testing.

When the seasonal distribution of emergency department visits was examined, the highest number of visits occurred in the fall months. This was followed by summer, spring, and winter months. The increase in visits during the fall and summer months may be related to various environmental and social factors. Seasonal weather changes, increased travel and population mobility during the summer months, and the intensity of agricultural activities are factors that can increase the frequency of trauma, infections, and other emergencies, thereby increasing emergency department visits. The literature also reports that gastrointestinal infections, trauma, and accidents are more common in summer and autumn, with a corresponding increase in emergency department visits. In particular, increased exposure to contaminated water and population mobility during the summer months can lead to an increase in Hepatitis A cases transmitted through the fecal-oral route. Indeed, although Anti-HAV IgM positivity was generally low in our study, it is understood that Hepatitis A screening should not be neglected in late summer and autumn. Therefore, considering that seasonal fluctuations may affect the incidence of infection during certain periods, it would be appropriate to plan diagnostic test requests

in emergency departments according to seasonal risks. In our study, it was found that 30.8% of patients were transported by ambulance and 69.2% presented to the emergency department on their own. The fact that the majority of presentations were made on foot indicates that access to emergency departments is easy in the community and that individuals tend to seek hospital care even with mild symptoms. On the other hand, the rate of patients transported by ambulance reaching approximately one-third is noteworthy. This situation can be explained by the fact that the center where the study was conducted is a regional referral hospital and patients are referred from surrounding hospitals for advanced examination or treatment.

In the literature, it is reported that patients transported by ambulance generally represent more serious and urgent medical conditions, and therefore diagnostic tests with high diagnostic value are more frequently applied in this group. For example, comprehensive screening panels are recommended in cases of severe trauma, massive bleeding, or altered consciousness. Similarly, in our study, considering that systemic infection, severe trauma, and gastrointestinal bleeding were more common among patients brought by ambulance, it is considered that hepatitis serology requests are important in this group both from a diagnostic perspective and for protecting healthcare personnel from infection risk.

The data obtained demonstrate that the heterogeneous nature of the patient group presenting to the emergency department and different clinical scenarios directly influence testing practices. In particular, viral hepatitis screening tests were more frequently requested in patients presenting with bleeding and pregnancy-related complaints. Seasonal changes can affect the number of patients arriving at the emergency department and the types of infections observed during certain periods. Additionally, patients arriving by ambulance typically present with severe clinical conditions, while those presenting on foot often have milder symptoms or maybe asymptomatic. This suggests that patients presenting on foot could be an important target group for random screening. In conclusion, test requests and positivity rates in the emergency department vary depending on clinical context factors such as the mode and reason for presentation.

The majority of patients evaluated in the study were discharged after outpatient treatment in the emergency department, with 47.9% admitted to relevant clinics. The most common departments for admission were Gynecology and Obstetrics (15.7%), Orthopedics (10.8%), General Surgery (9.2%), and Gastroenterology (2.7%). This distribution is consistent with the presenting complaints. Prenatal obstetric complaints and gynecological bleeding explain the high number of admissions to the obstetrics and gynecology department, while trauma-related falls account for the high rate of admissions to the orthopedics department. The relatively high number of admissions to the general surgery department may be related to the presence of abdominal emergencies requiring surgical intervention or intra-abdominal bleeding. The relatively low rate of admissions to the gastroenterology department can be explained by the fact that most patients who tested positive for hepatitis were referred to outpatient follow-up for further examination and treatment or were discharged without admission due to mild clinical symptoms. These findings demonstrate that screenings performed in the emergency department play a critical role not only in making an immediate diagnosis but also in referring patients to the appropriate departments and integrating them into the healthcare system. When serological test positivity rates were examined according to patients' presenting complaints, it was observed that immune markers were higher in certain complaint groups. For example, the Anti-HAV IgG positivity rate was 75% in patients presenting with falls, 71.4% in those with bleeding complaints, and 60% in those with abdominal pain. Since these three groups primarily consist of individuals of middle-to-advanced age or those with underlying medical conditions, it is likely that most patients acquired natural immunity through childhood or adolescent Hepatitis A infection or vaccination. The Anti-HBs positivity rate was determined to be 72.6% among those who presented for general health screening and 53.6% among those with pregnancy-related complaints. The Anti-HBs positivity rate exceeding 72% in the general medical examination group, which included asymptomatic individuals, indicates that the majority of these individuals are either vaccinated against hepatitis B or have developed natural immunity. This rate is higher

than the Anti-HBs positivity rates reported in the general population of some European countries (e.g., 55% in Spain and 48% in Germany). The detection of Hepatitis B immunity in more than half of patients presenting with pregnancy-related complaints further underscores the successful implementation of screening and vaccination programs conducted before and during pregnancy in our country (11).

Differences in serological test results according to the nature of the complaint and the clinic indicate that test request behavior is largely shaped by the clinical context. For example, physicians request viral hepatitis tests more frequently in cases of preoperative evaluation, prenatal screening, or situations where blood transfusion is likely (29). Our findings support this practice, as a significant proportion of patients in these groups were already vaccinated or had developed natural immunity. The high positivity rates for Anti-HAV IgG and Anti-HBs tests reflect the overall immunity level in the population and the success of long-standing vaccination programs. However, the fact that active infection markers such as Anti-HAV IgM, HBsAg, and Anti-HCV remained below 1% in almost all groups supports the notion that acute viral hepatitis infections are rare in the community. This situation, as emphasized in the literature, highlights the important role of emergency departments in both diagnosing acute infections and identifying "silent" carriers.

The main findings of our study underscore the concrete outcomes of successful public health interventions and emergency department-based screening programs targeting viral hepatitis in Turkey. It has been established that there is widespread immunity against Hepatitis A and B in the community, while active hepatitis infections are observed at very low rates. High Anti-HAV IgG and Anti-HBs positivity rates indicate that a large portion of the population is immune to these viruses, while Anti-HAV IgM and Anti-HCV positivity rates below 1% suggest that new acute cases are rare. This situation is a natural consequence of the childhood vaccination programs implemented since the 1990s and the acquired immunity resulting from previous infections in the population.

However, the detection of newly diagnosed carriers in a small group in our study is noteworthy. For example, although HBsAg positivity remained at 3% in the general

preoperative screening group, the higher rate in patients considered to be at risk indicates that symptom- and risk-based screening is more effective in detecting infection. On the other hand, it has been observed that widespread screening of asymptomatic individuals is effective in identifying carriers who are outside the healthcare system.

These findings confirm that Turkey still has moderate endemic characteristics in terms of viral hepatitis; however, thanks to widespread vaccination and natural infections, significant immunity against HAV and HBV has been established in the adult population. Indeed, the data from our study are consistent with national-scale research. For example, Çelikbaş et al. (2012) reported an Anti-HAV IgG prevalence of 64.1% nationwide in Turkey, with rates exceeding 80% in the Eastern and Southeastern Anatolia regions (30). Similarly, the high Anti-HBs rates observed in our study reflect the long-term success of the Hepatitis B vaccination program implemented since the neonatal period.

The very low prevalence of Anti-HCV positivity is consistent with national data and suggests that HCV screening in the emergency department may have limited potential for identifying new cases. However, regardless of how low the rate is, every positive case detected is critically important for ensuring that the individual is included in the diagnosis and treatment process. The World Health Organization (WHO) aims to achieve 90% diagnosis of hepatitis B and C infections and 80% treatment access for diagnosed individuals by 2030 (31). The high immunity rates revealed in our study paint a positive picture for our country in terms of achieving these goals. However, newly identified carrier cases in the emergency department indicate that undiagnosed individuals still exist in the community, highlighting the need to strengthen screening programs and associated treatment/follow-up processes.

This study has some limitations due to its retrospective design. First, the data only includes patients who visited a single tertiary university hospital; therefore, the results may not be directly generalized to the entire country. Second, the data used in this study was obtained from the hospital automation system and laboratory records, so missing or incorrect the

possibility of records cannot be ruled out. Additionally, the study did not allow for a detailed assessment of patients' risk factors, vaccination history, and past medical history. Finally, since the positivity of serological tests was not confirmed by confirmatory tests (e.g., HCV-RNA, HBV-DNA), it was not possible to definitively determine the presence of active infection. Future studies should be conducted using a multicenter and prospective design to increase the generalizability of the data obtained. In particular, prospective screening conducted in emergency departments it is recommended that future studies be designed to cover both risk groups and the general population. In addition, evaluating positive cases identified through serological screening with confirmatory tests and collecting long-term follow-up data on these patients will contribute significantly to demonstrating the effectiveness of screening. Planning community-based studies that thoroughly investigate patients' vaccination history and risk factors may also assist in developing national vaccination and screening strategies.

CONCLUSION

Emergency departments are strategic contact points where individuals with weak links to the health system can be identified. The serological screening conducted in the emergency department in this study demonstrated the prevalence of immunity in the community and also identified some "silent" carriers of infection. National and international data suggest that large-scale screening strategies extending beyond risk groups can make a meaningful contribution to the elimination of viral hepatitis. For example, a multicenter study in Barcelona found that universal hepatitis screening in the emergency department resulted in higher rates of new case detection compared to risk-based testing and was cost-effective (32). The high immunity rates identified in our study reflect the success of national vaccination programs, while the new cases detected in the emergency department highlight the importance of increasing the continuity and scope of screening programs. In this context, emergency departments achieving Turkey's viral hepatitis elimination goals should be considered an effective public health tool in, both in diagnosing acute infections and identifying undiagnosed chronic carriers.

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