Research Article

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Evaluation of Hepatitis A Seroprevalence in Patients Admitted to a University Hospital

Bir Üniversite Hastanesine Başvuran Hastalarda Hepatit A Seroprevalansının Değerlendirilmesi

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ABSTRACT

Objectives: Hepatitis A virus (HAV) is a ribonucleic acid virus that usually causes acute self-limiting liver disease and is transmitted via the fecal-oral route. The prevalence of HAV is an indicator of socioeconomic level and closely related to geographical differences and hygiene.

Materials and Methods: This study aimed to investigate the seropositivity of anti-HAV immunoglobulin G (IgG) and anti-HAV IgM in patients of different age groups admitted to our hospital. A total of 3,110 cases were analyzed using the electrochemiluminescence immunoassay method and patients were divided into four age groups: 0-12 years, 13-17 years, 18-35 years, and over 35 years old. The chi-square test was used to evaluate the anti-HAV IgG serological variable about the independent variables such as age and gender.

Results: There was no significant difference between genders. However, a statistically significant difference was observed between the 0-12 and 13-17 age groups, as well as between the 18-35 and >35 age groups. Anti-HAV IgM reactivity was detected only in a 43-year-old female. HAV seropositivity between 13 and 35 years of age is significantly lower, suggesting that the vaccine should also be administered to young adults.

Conclusion: Seroprevalence data is crucial for outbreak prevention, guiding public health measures such as sanitation and hygiene, and particularly for planning vaccination programs.

Keywords: Hepatitis A, seroprevalence, anti-HAV IgM, anti-HAV IgG, vaccination

ÖZ

Amaç: Hepatit A virüsü (HAV), genellikle kendi kendini sınırlayan akut karaciğer hastalığına neden olan ve fekal-oral yolla bulaşan bir ribonükleik asit virüsüdür. HAV prevalansı sosyoekonomik düzeyin bir göstergesidir ve coğrafi farklılıklar ve hijyen ile yakından ilişkilidir.

Gereç ve Yöntemler: Bu çalışmada hastanemize başvuran farklı yaş gruplarındaki hastalarda anti-HAV immünoglobulin G (IgG) ve anti-HAV IgM seropozitifliğinin araştırılması amaçlanmıştır. Toplam 3.110 olgu elektrokemolüminesans immünoassay yöntemi kullanılarak analiz edilmiş ve hastalar dört yaş grubuna ayrılmıştır: 0-12 yaş, 13-17 yaş, 18-35 yaş ve 35 yaş üstü. Anti-HAV IgG serolojik değişkenini yaş ve cinsiyet gibi bağımsız değişkenler açısından değerlendirmek için ki-kare testi kullanılmıştır.

Bulgular: Cinsiyetler arasında anlamlı bir fark bulunmamıştır. Ancak, 0-12 ve 13-17 yaş grupları ile 18-35 ve >35 yaş grupları arasında istatistiksel olarak anlamlı bir fark gözlenmiştir. Anti-HAV IgM reaktivitesi sadece 43 yaşında bir kadında tespit edilmiştir. HAV seropozitifliğinin 13 ve 35 yaş arasında önemli ölçüde düşük olması, aşının genç yetişkinlere de uygulanması gerektiğini düşündürmektedir.

Sonuç: Seroprevalansın değerlendirilmesi, salgınların önlenmesi, sanitasyon ve hijyen önlemleri gibi koruyucu politikaların oluşturulması ve özellikle etkili aşılama programlarının oluşturulması için gereklidir.

Anahtar Kelimeler: Hepatit A, seroprevalans, anti-HAV IgM, anti-HAV IgG, aşı

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Introduction

Hepatitis A virus (HAV) is a 27-32 nanometer diameter non-enveloped ribonucleic acid virus and a member of the genus *Hepatovirus* of the *Picornaviridae* family (1). It is considered highly contagious due to its resistance to disinfectants and heat (2). HAV infection is an acute, self-limiting liver disease that has been known for centuries, causing jaundice epidemics and is usually transmitted by oral ingestion of contaminated water and food. The clinical picture shows a wide spectrum ranging from asymptomatic infection to fulminant hepatitis with high mortality (3). The incubation period of the disease is 15-50 days with an average of 30 days. The severity of the disease is age-related, jaundice is usually not seen in children and most infections are mild or asymptomatic. In adulthood, the disease can lead to severe clinical pictures. Since there is only one serotype of HAV, the infection leads to lifelong immunity and the immunoglobulin G (IgG) antibodies formed remain for a lifetime. Detection of anti-HAV IgG is the standard method for seroprevalence studies (4,5,6). Although the incidence of HAV infection varies based on socio-economic status and regions, it is common all over the world. It has been reported that anti-HAV IgG seropositivity is decreasing significantly and the cases are shifting towards older ages as socio-economic conditions improve (7).

In a meta-analysis conducted in our country, data from 63 studies were evaluated, it was shown that the average seroprevalence was 53% and the importance of age-specific prevalence studies was emphasized (8). The study aimed to investigate the seropositivity of anti-HAV IgG and anti-HAV IgM in patients of different age groups admitted to our hospital.

Materials and Methods

Between May 2021 and May 2024, patients who were admitted to Ordu University Training and Research Hospital were retrospectively included in this study. The anti-HAV IgM and IgG parameters of the 3,110 cases were analyzed using the electrochemiluminescence immunoassay method on the Cobas e601 (Roche, Germany) device. Patients were divided into four age groups: 0-12 years, 13-17 years, 18-35 years, and over 35 years old. The seropositivity of HAV in each group was determined.

Statistical Analysis

Statistical evaluation was performed with SPSS 22.0. The chi-square test was used to evaluate anti-HAV IgG serological variables according to independent variables such as age and gender and p-value <0.05 was considered significant. This study was carried out in compliance with the Declaration of Helsinki with the approval of Ordu University Non-Interventional Scientific Research Ethics Committee dated October 11, 2024 and numbered 2024/142.

Results

Among the 3,110 cases included in the study, 1,848 (59.4%) were female and 1,262 (40.6%) were male. Anti-HAV IgG reactivity was detected in 60.9% of the female and 60.2% of the male cases, with no statistically significant difference between genders (p=0.691). The anti-HAV IgG reactivity results by age distribution are shown in Table 1.

When examining the age distribution of the cases, anti-HAV IgG seropositivity was significantly higher in the 0–12 age group (72.4%) compared to the 13-17 age group (10.8%) (p<0.001). Similarly, seropositivity significantly increased to 88.6% in the >35 age group compared to 46.7% in the 18-35 age group (p<0.001).

Anti-HAV IgM reactivity was detected in only one case, a 43-year-old female patient admitted to the physical therapy and rehabilitation outpatient clinic.

Discussion

HAV is the leading cause of viral hepatitis in children. It has shifted to affecting older age group as a result of improved hygiene and sanitation conditions (9,10). The infection is usually self-limiting, asymptomatic, non-chronic and rarely fulminant when acquired at an early age. The prevalence of HAV infection depends on many factors such as age, socioeconomic level, hygiene and sanitation conditions. It varies between countries and even among regions within the same country. To take preventive measures against the infection and determine vaccination policies, it is important to assess the prevalence of HAV infection in the community (11). This study was conducted to determine HAV seroprevalence rates in our region and to emphasize the need for preventive measures.

HAV has a low mortality rate but it is recognised as a public health problem that needs to be addressed as it causes outbreaks leading to workforce loss (12). The prevalence of HAV infection shows three endemicity patterns: high, intermediate and low (13). While certain developed countries exhibit low levels of endemicity, regions including the Middle East and Southern Europe are classified as areas of intermediate endemicity (14). Türkiye is categorised as

Table 1: Anti-HAV IgG reactivity by age groups

	Anti-HAV IgG		Total	p-value
Age groups	Reactive (%)	Non-reactive (%)		
0-12	42 (72.4%)	16 (27.6%)	58	p<0.001
13-17	14 (10.8%)	116 (89.2%)	130	
18-35	848 (46.7%)	966 (53.3%)	1,814	p<0.001
>35	982 (88.6%)	126 (11.4%)	1,108	
Total	1,886 (60.6%)	1,224 (39.4%)	3,110	

P-values indicate the difference between 0-12 and 13-17 years; 18-35 and >35 years age groups
HAV: Hepatitis A virus, IgG: Immunoglobulin G

intermediately endemic in terms of HAV seroprevalence (15). The prevalence of HAV infection is decreasing in developing countries of the world. The general serological prevalence of HAV was determined as 38.3% in a study conducted in Jordan in 2021 and 25.1% in a study conducted in Kuwait in 2023 (16,17).

Different HAV seroprevalence rates have been reported in various studies conducted in Türkiye: 67.2% in İstanbul in 2024, 88.25% in Gaziantep in 2024, 73.89% in Uşak in 2021, 48.6% in Van in 2021, 87.3% in Erzurum in 2020, 57% in Karabük in 2020, 79.1% in Yozgat in 2019, 74% in İzmir in 2019, 58.9% in Samsun in 2019, 97.4% in Bingöl in 2018 (15,18,19,20,21,22,23,24,25,26,27). Different socio-economic conditions are thought to be the primary determinant for the regional differences in HAV seroprevalence in Türkiye. In our study, the anti-HAV seroprevalence was found to be 60.6%, which is below the average HAV seroprevalence in our country, but similar to that of Samsun and Karabük cities in our region (21,23).

While the impact of gender on HAV seroprevalence has been widely studied, our findings indicate no significant difference between genders in HAV seroprevalence. In studies conducted by Vilibic-Cavlek et al. (28) in Croatia, and Ayouni et al. (29) in Tunisia, no significant difference in HAV seropositivity was reported in terms of gender. In a study conducted in Lisbon, Cortes-Martins et al. (30) reported that HAV IgG seroprevalence rates of 44.4% among women and 53.6% among men with no statistically significant difference detected. In a study conducted in İstanbul, HAV seroprevalence was significantly higher in men with 70.69% (15). A study by Alkan Ceviker et al. (21) showed HAV seropositivity was found to be 75.3% in women and 33.1% in men. In Yilmaz's (26) study, it was noted that a significantly higher HAV IgG seropositivity in men. Kalaycı and Çalgın (27) determined anti-HAV IgG positivity as 54.7% in women and 56.6% in men in their study with healthcare workers and found no statistically significant difference. In the study by Tuna et al. (25), in patients applying to primary health care institutions, no significant relationship was found between anti-HAV IgG seropositivity and gender.

In alignment with World Health Organization recommendations, the HAV vaccine was included in Türkiye's national childhood vaccination schedule in 2012, with a two-dose regimen at 18 and 24 months of age. Our study compared anti-HAV IgG seropositivity rates across age groups. The prevalence of anti-HAV IgG was 72.4% in the 0-12 age group, 10.8% in the 13-17 age group and 46.7% in the 18-35 age group. The vaccination program appears to be a major factor in these results. Similar results showing the effect of the vaccination programme were found in other studies conducted in our country (15,19,22). We think that the low immunity in adolescents and young adults is a result of these age groups not yet being routinely vaccinated against HAV in our country. In our study, seroprevalence was 88.6% after 35 years of age. A 2022 study in Somalia showed the lowest seroprevalence (29.4%) in the 1-2 age group, with the highest (88.9%) observed in individuals over 41 years old (31). Similarly, Ciftci et al. (32) observed an increase in HAV IgG seropositivity in the 0-5 age group between 2015 and 2023.

According to a study conducted in 2023, anti-HAV IgG positivity was found to be 16.8% in children aged 13-17 years (33). In the study conducted by Yiş and Değirmenci (34) in unvaccinated children, seropositivity rates were found to be 19.25% in the 0-6 age group and 41.52% in the 7-15 age group. In 2019, in a study conducted by Alkan Ceviker et al. (21) in Samsun, it was reported that the seroprevalence of anti-HAV IgG was 40.9% and 34.4% under the age of 18 and under the age of 30, respectively. In another study conducted in 2014 evaluating HAV seroprevalence, the anti-HAV IgG positivity rate was reported as 66.4% in the 13-18 age group (35). In our study, the reason for the low anti-HAV IgG seropositivity in the 13-18 age group may be that the incidence of infection has decreased in recent years due to increased public awareness about viral hepatitis, better knowledge of the transmission routes of the disease and breaking the chain of infection. The ongoing childhood HAV vaccination program since 2012 has been quite effective in breaking the chain of infection in society. However, the high proportion of children in the 13-17 age group who have not been exposed to HAV highlights the need for vaccination in this age group as well.

Evidence from various studies indicates a shift of HAV infection affecting older age groups, which is associated with more severe clinical manifestations and increased mortality (14,36). Acikgoz et al. (37) showed that anti-HAV IgG seropositivity was 34.9% in first-year health students in their study and recommended vaccination for acute HAV infection in the patient group between the ages of 18-37. Similar to our study, Düzenli et al. (38) also found high vaccine-associated anti-HAV IgG positivity in children under ten and high HAV susceptibility in adults over thirty. In parallel, Akman et al. (39) reported that vaccine-associated anti-HAV IgG seronegativity shifted to adolescents. Kalaycı and Çalgın (27) found the anti-HAV IgG positivity rate to be 35.8% in the 16-25 age group among healthcare workers. The data of our study are consistent with the literature and show that the age of exposure to the virus has shifted towards young adulthood.

Although HAV seroprevalence in Türkiye is decreasing, it remains a significant public health issue. The anti-HAV IgM rate in our study was 0.03%, much lower than the national prevalence, reported between 0.18% and 1.2% in recent studies (18,38,40). Due to the higher incidence of complications due to acute HAV in older age groups, it has become necessary to vaccinate especially seronegative adults (21). Our findings also suggest that seronegative adults should be included in vaccination programs. In a study conducted in Beijing, it was highlighted that adults would be susceptible to HAV due to attenuation of antibodies resulting from vaccination, which would lead to a possible HAV epidemic. Future studies are essential to establish the need for booster immunization (41).

Study Limitations

This study is subject to several limitations. The study did not achieve a sufficient sample size and data were obtained from a single-center. To contribute to the epidemiological data of our country, the study should be supported by a multicenter study.

Conclusion

The results of this study can serve as a guide for HAV seroprevalence in the Central Black Sea region. Routine HAV

vaccination programs implemented since 2012 have significantly increased seropositivity among children aged 0-12. In addition, HAV seropositivity between 13 and 35 years of age is significantly lower, indicating that HAV vaccine should also be considered for young adults. Seroprevalence data is crucial for outbreak prevention, guiding public health measures such as sanitation and hygiene, and particularly for planning vaccination programs.

Ethics

Ethics Committee Approval: This study was carried out in compliance with the Declaration of Helsinki with the approval of Ordu University Non-Interventional Scientific Research Ethics Committee dated October 11, 2024. and numbered 2024/142.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Y.İ., H.Ö.K., Concept: Y.İ., M.K.Ç., Design: Y.İ., H.Ö.K., Data Collection or Processing: Y.İ., H.Ö.K., Analysis or Interpretation: Y.İ., H.Ö.K., M.K.Ç., Literature Search: Y.İ., H.Ö.K., Writing: Y.İ., H.Ö.K., M.K.Ç.

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