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The Effect of Vaccine Policy on HAV Seropositivity of Syrian Immigrants and Local Turkish People

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ABSTRACT

Introduction: Hepatitis A virus (HAV) infection poses a significant public health problem worldwide, especially in developing countries. This study investigated the effect of vaccination policies on the HAV seropositivity of Syrian immigrants and local Turkish people. **Methods:** The anti-HAV antibodies of 6007 patients, including 5613 (93.4%) Turks and 394 (6.6%) Syrian suspected of HAV infection, were analyzed by the chemiluminescent microparticle immunoassay (CMIA) method. **Results:** In our study, total anti-HAV positivity was higher in Turkish patients than in Syrian patients in the 0-9 age group, while in the 10-19, 20-29, and 30-39 age groups, the rate was higher in Syrians. Anti-HAV seropositivity was significantly higher in Turkish male patients than female patients. The young adult and adult age groups of Turks were more at risk of HAV infection, i.e., when the disease is symptomatic. **Conclusion:** Vaccination of young and young adult seronegative Turks and ensuring Syrian children's participation in the routine vaccination program implemented in our country is a requirement for preventing HAV infection.

INTRODUCTION

Hepatitis A virus (HAV) infection poses a significant public health problem worldwide, especially in developing countries. HAV infection frequency varies by age, depending on the socioeconomic, hygienic, and health conditions of the various geographical regions [1-3]. The HAV infection is acquired through the fecal-oral route, spreading faster in areas with inadequate health conditions and insufficient water sources, particularly among people living in crowded environments. Therefore, HAV seroprevalence is higher in developing communities than in developed countries (1-4). HAV infection is generally asymptomatic under the age of 10 in developing societies (5, 6). In regions where HAV infection is moderately endemic, the delay in exposure to the virus causes adolescents and adults to remain sensitive to the virus, increasing infection rates among these groups [2, 7].

HAV infection is symptomatic in adulthood with significantly increased complications and morbidity rates, resulting in death [7-10]. Recommendations for deploying the hepatitis A vaccine to prevent infection vary significantly between countries. In developing countries, the hepatitis A vaccination is a part of the national vaccination policy for children, while in developed countries, it targets only risk groups such as travelers to endemic regions and chronic liver disease patients [2, 11, 12].

According to the Directorate General of Migration Management, Ministry of Interior of Turkey in 2018, due to the civil war in Syria, about 3,607,563 Syrian refugees have received temporary protection status, of which 162 471 are in Bursa [13]. Due to socioeconomic and environmental factors, these immigrants suffer from many health problems, including HAV infection [14, 15].

Our study aimed to compare the Syrian anti-HAV positivity with local Turkish people living in Turkey's temporary protection status following admission to the hospital. Moreover, we aimed to determine the effect of vaccine policies on total anti-HAV seropositivity.

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MATERIALS AND METHODS

The total anti-HAV antibodies were assayed for patients admitted to Bursa Yuksek Ihtisas Training and Research Hospital. Our cohort study included 6007 individuals, including 5613 (93.4%) Turks and 394 (6.6%) Syrian. Patients were grouped according to gender, age groups (with 10-year intervals), as well as the pediatric (<18) and adult (≥18) age groups.

From June 2016 to December 2017, 10 mm of blood samples were obtained from patients and centrifuged to separate the sera. According to manufacturer recommendation, the anti-HAV total antibody in sera was determined by the CMIA method in a fully automated device (Roche Diagnostics, COBAS 6000, Germany). Samples with total anti-HAV below 20 IU/L were considered negative, and those with ≥20 IU/L were positive.

Statistical analyses for comparing the Syrian and Turkish patients by age groups and gender were performed in the SPSS-20 software by the Pearson chi-square test. Values with $P<0.01$ and $P<0.05$ were considered statistically significant.

The ethics committee of Bursa Yuksek Ihtisas Training and Research Hospital approved the study (Ref: 2011-KAEK-25 2020/10-09).

RESULTS

Our study compared the total anti-HAV in Syrian and Turkish patients based on the age groups (Table 1). Total anti-HAV positivity was significantly higher in Turkish patients (71.3%) than in Syrian patients (58.2%) in the 0-9 age group, while, in the age groups 10-19, 20-29, and 30-39, the rates were significantly higher in Syrian patients (68.5%, 78.7%, and 87.0%) compared to Turkish patients (22.5%, 37.9%, and 72.1%) (Table 1).

Table 1. Comparison of anti-HAV total test results of Syrian and Turkish patients according to specified age groups

Age	Nationality	Total Anti-HAV				*P*
		Negative		Positive		
		No.	%	No.	%	
0-9	Syrian	41	41.8	57	58.2	**0.008**
	Turk	237	28.7	589	71.3	
10-19	Syrian	28	31.5	61	68.5	**0.000**
	Turk	1360	77.5	395	22.5	
20-29	Syrian	13	21.3	48	78.7	**0.000**
	Turk	425	62.1	259	37.9	
30-39	Syrian	6	13.0	40	87.0	**0.034**
	Turk	117	27.9	302	72.1	
40-49	Syrian	3	11.5	23	88.5	1.000
	Turk	47	12.9	316	87.1	
50-59	Syrian	0	0.0	26	100.0	0.153
	Turk	33	8.6	352	91.4	
60-69	Syrian	3	12.5	21	87.5	0.710
	Turk	36	8.4	391	91.6	
70-79	Syrian	1	7.7	12	92.3	1.000
	Turk	29	6.9	393	93.1	
80-89	Syrian	0	0.0	5	100.0	1.000
	Turk	24	8.5	257	91.5	

Our study also compared the total anti-HAV positivity among Syrian and Turkish patients according to gender. In Turkish patients, anti-HAV positivity was significantly higher in males (60.2%) than females (57.5%), but there was no significant difference in anti-HAV positivity rates by gender in Syrian patients (Table 2).

Table 2. Comparison of total anti-HAV results among Syrian and Turkish patients in terms of gender

Total Anti-HAV	No. (%) Syrian Males	No. (%)Syrian Females	*P*	No. (%) Turk Males	No. (%)Turk Females	*P*
Negative	53(25.0)	43(23.8)	0.814	993(39.8)	1321(42.5)	**0.041**
Positive	159(75.0)	138(76.2)		1504(60.2)	1789(57.5)	

In the adult age group patients, the total anti-HAV positivity was significantly higher in Syrian (84.9%) than in Turks (68.0%). Also, in the pediatric age group, anti-HAV positivity was significantly higher in Syrian patients (62.1%) than Turkish patients (42.1%) (Table 3).

Moreover, anti-HAV positivity was significantly higher in Turkish adult patients (68.0%) than Turkish pediatric patients (42.1%). Also, total anti-HAV positivity was significantly higher in Syrian adult patients (84.9%) than in Syrian pediatric patients (62.1%) (Table 3).

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Table 3. Comparison of anti-HAV total results of Syrian and Turkish patients among pediatric and adult age groups

Total Anti-HAV	Syrian		Turk		*P*
	Pediatrics	Adults	Pediatrics	Adults	
	No. (%)	No. (%)	No. (%)	No. (%)	
Negative	61 (37.9)	35 (15.1)	1162 (57.9)	1152 (32.0)	**0.000**
Positive	100 (62.1)	197 (84.9)	846 (42.1)	2447(68.0)	

DISCUSSION

HAV seroprevalence distribution varies significantly between countries and regions in terms of age groups. According to World Health Organization Hepatitis A global seroprevalence publication; anti-HAV seropositivity (immunity or disease transmission rate) was low (<20%) in childhood, and anti-HAV sensitivity rate (the risk of having the disease) was high (40%) in adults in Asia Pacific countries such as Japan, Korea, Singapore, Western Europe countries like Italy, France, Germany, Spain and Australia countries [4, 16, 17]. Anti-HAV seropositivity was medium-high (75-89%) in childhood, and HAV sensitivity (risk of disease) was low (1-9%) during adulthood in Latin American countries such as Venezuela, Mexico, Argentina, Chile, and in South Asian countries such as India, Afghanistan, and Pakistan [4, 18]. In African countries, almost all the children (95-100%) acquire HAV infection by the age of five years, while in adulthood, the HAV sensitivity remains very low (1-9%) [4, 15]. In the Middle East countries, including Turkey, anti-HAV seropositivity (immunity or disease transmission rate) was determined moderate (60-74%) in adults, and HAV sensitivity rate (risk of disease) was low in adults (1-9%) [4, 19-21].

According to our study, the HAV seroprevalence (rate of immunization or disease transmission) in the 0-9 age group was higher in Turks than Syrians (P<0.008) (Table 1). Since 2012, in Turkey, vaccination against Hepatitis A has been part of routine vaccination programs with two doses, the first in 18 months and the second in 24 months. According to our study, the low immunity of Syrian children in the 0-9 age group indicates that Syrian children do not adequately receive the routine vaccination.

In our study, the anti-HAV seropositivity was low to medium (22.5%, 37.9%, 72.1%) in Turks in the age groups of 10-19, 20-29, 30-39 (in adolescent and young adults) and HAV sensitivity (risk of passing the disease) was higher than Syrians (Table 1). In our study, the low seropositivity in the age group of 10-29 suggests insufficient vaccination coverage after 18 years. This result may be because the vaccine was deployed only in the routine childhood vaccination program in 2012.

In a previous study, anti-HAV antibody prevalence was 91.2% and 70.3% in children ≤18 years of age in refugees, and asylum seekers in Germany, the prevalence of HAV infection was higher in refugees than in the general German population (22), similar to our study. The higher anti-HAV seropositivity rates of Syrians compared to Turks in pediatric and adult age groups (P <0.01, P <0.01 indicate that Syrians were exposed to HAV infection more frequently. Since Syrians generally have temporary protection status in our country, living in crowded communities with lower socioeconomic status may expose them to more HAV infection [23-27].

The higher anti-HAV positivity rate among Turkish male patients (P <0.05) indicated more exposure to HAV infection than females. The low level of sanitation, personal hygiene, socioeconomic status, and overcrowding environments like military service may cause Turkish men to have more frequent HAV infection than female patients [28-30].

Because of living in the same region and the ongoing migration from Syria to Turkey, and the lower immunity of Turkish people to HAV compared to the Syrian population, Turks are vulnerable to HAV infection in young adult and adult age groups when HAV disease is symptomatic [31-33].

Vaccination of young and young adult Turks that are negative for anti-HAV antibodies and ensuring Syrian children's participation in the routine vaccination program implemented in our country is a requirement for effective prevention against HAV infection.

The limitations of our study were such that clinical disease complications, morbidity, and mortality rates related to HAV infection could not be determined.

More studies are needed to demonstrate the impact of Syrians' migration in the region on the HAV infection rate.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest associated with this article.

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