

Hepatitis A, B, C and HIV seroprevalence among Syrian refugee children admitted to outpatient clinics

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SUMMARY

Viral hepatitis is the most common cause of serious health problems such as liver cirrhosis and hepatocellular carcinoma (HCC). Leading to immunodeficiency disorders through different mechanisms, Human Immunodeficiency Virus (HIV) causes the development of severe secondary infections. Hepatitis A (HAV) is thought to spread by the faecal-oral route, while Hepatitis B (HBV), Hepatitis C (HCV) and HIV are mostly transmitted vertically during childhood. In our study, we aimed to determine the seroprevalence of HAV, HBV, HCV and HIV among Syrian refugee children who were admitted to outpatient clinics. We conducted a retrospective review of data concerning 171 Syrian children aged between 0-18 years admitted between April 2014 and December 2015 to the outpatient infectious disease clinic of İzmir Tepecik Training and Research Hospital and the social welfare outpatient clinic for Syrian refugees for reasons other than jaundice. Serum samples from patients were studied for HAV antibody IgG (anti-HAV IgG), HBV surface antigen (HBsAg), antibodies against HBV surface antigen (anti-HBs), antibodies against HBV core antigen (anti-HBc total), HCV antibody (anti-HCV) (anti-HIV) with the ELISA (*Enzyme-Linked Immunosorbent Assay*) method. In this study 51% of patients were female, with a mean age of 6.52 years among all patients. Six of the 140 patients (4.2%) scanned for HBV among

the patients enrolled in the study were HBsAg and anti-HBc total positive and anti-HBs negative. Three patients (2.1%) were HBsAg negative, and anti-HBc total and anti-HBs positive, which indicated they had previously recovered from an HBV infection. HBsAg, anti-HBs, anti-HBc total data for 140 patients (81.9%), anti-HCV data for 109 patients (63.8%), anti-HIV data for 88 patients (51.5%) and HAV IgG data for 86 patients (50.3%) were obtained. Due to migration from regions in Syria where there is no regular follow-up of HBV vaccination in children, HBsAg seroprevalence of refugee children is thought to be higher than in other children in Turkey and anti-HBs positivity is thought to be lower. We expected to see a higher seroprevalence of anti-HCV and anti-HIV in Syria due to the lack of health facilities such as non-regular anti-HCV and anti-HIV screening before blood transfusions and during pregnancy in all regions of Syria. Yet in this study, the anti-HCV, anti-HIV seroprevalence of Syrian refugee children was similar to that in Turkey. According to the results, if the children of asylum seekers are admitted to the national HAV and HBV vaccination schedule, hepatitis infections and their complications may be prevented.

Keywords: Refugee children, Hepatitis A, Hepatitis B, Hepatitis C, HIV.

INTRODUCTION

The hepatitis A virus (HAV) is the most common viral hepatitis both worldwide and in Turkey [1]. This virus mostly spreads by the faecal-oral

route. In 2012, it was included in the routine vaccination schedule for children in Turkey. This virus is asymptomatic in paediatric and adolescent age groups. Symptoms and complications of viral hepatitis associated with HAV are more common in adults that have not encountered HAV or have not been vaccinated against HAV during childhood. The hepatitis B virus (HBV) is the most common cause of chronic viral hepatitis around the world. HBV and the hepatitis C virus (HCV) are trans-

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mitted from infected mothers to newborns (vertically), parenteral contact with infected blood and body fluids (percutaneously), and rarely through sexual intercourse in paediatric and adolescent age groups. In the case of perinatal transmission during childhood, these may become chronic by 90% in newborns and by 20-50% in the 1-5 age group [2, 3]. The HBV vaccine was included in the routine vaccination schedule for children in Turkey, in 1998. Both HBV and HCV are cause of serious health issues such as liver cirrhosis and hepatocellular carcinoma (HCC).

The Human Immunodeficiency Virus (HIV) is transmitted mostly vertically during childhood. HIV causes the development of severe secondary infections through leading to immunodeficiency disorders with different mechanisms.

Seroprevalence of HAV, HBV, HCV and HIV differentiates among regions due to various reasons throughout the world. The paediatric vaccination schedule and health services in Syria are different to those in Turkey. The Turkish Ministry of Health and the Syrian Ministry of Health recommend three doses of HBV vaccination. HAV vaccination is done in our country in the form of 2 doses in routine vaccination program, but in Syria there is not existing HAV vaccination program. But because of the war conditions in Syria, there is not full adherence to vaccination schedule. Also in Turkey family practitioners are following a strict follow-up of the children vaccination, in this way, compliance with the vaccination program is being enhanced. However, in Syria there is not any vaccination program followed by family practitioners. HBsAg and anti-HBs negative subjects were recommended to undergo recombinant HBV vaccination at 0-1 and 6 months and were directed to the vaccination center. Children who were found to be anti-HAV IgG negative were directed to the vaccination center for inactivated HAV vaccination at 0 and 6 months.

In our study, we aimed to determine the seroprevalence of HAV, HBV, HCV and HIV among Syrian refugee children who were admitted to outpatient clinics.

■ PATIENTS AND METHODS

Izmir is the largest city in western Turkey. It is estimated that there are 3 million Syrian refugees

living in Turkey and about 500 thousand of all in Izmir. Refugees mostly immigrated from Halep, Sam, Idlip (North Syria cities). Turkish government provides the same health insurance opportunities to Syrian refugees with Turkish citizens.

İzmir Tepecik Training and Research Hospital is a tertiary health care center which provides health care to low to middle socioeconomic population living in an urban area. Between April 2014 and December 2015, the data of 171 Syrian children aged between 0-18 years admitted to the outpatient infectious disease clinic of İzmir Tepecik Training and Research Hospital and the social welfare outpatient clinic for Syrian refugees for reasons other than jaundice were retrospectively reviewed. Age, gender and epidemiological data of patients were recorded retrospectively. Serum samples from patients were studied for HAV antibody IgG (anti-HAV IgG), HBV surface antigen (HBsAg), antibodies against HBV surface antigen (anti-HBs), antibodies against HBV core antigen (anti-HBc total), HCV antibody (anti-HCV) (anti-HIV) with the ELISA (*Enzyme-Linked Immunosorbent Assay*) (DiaSorin, Italy) method at the Infectious Diseases and Clinical Microbiology Laboratory of the Tepecik Education and Research Hospital. Informed consent was obtained from the children's parents without any monetary incentives being offered. Exclusion criteria included: Immunodeficiency or history of chronic disease or history of blood transfusion and incomplete data. The study was approved by the local ethic committee. Viral hepatitis stories could not be taken from the mothers because the majority of the children's mothers were low educated.

■ RESULTS

In this study 51% of patients were female, with a mean age of 6.52 years among all patients. Out of 140 Syrian refugees, 81 (57.8%) were from Halep, 38 (27.1%) were from Rakka, 21 (15%) were from other cities. Six of the 140 patients (4.2%) were HBsAg positive, and all of these patients were anti-HBc total positive and anti-HBs negative. Three patients (2.1%) were HBsAg negative, and anti-HBc total and anti-HBs positive which indicated they had previously recovered from an HBV infection. Our study investigated the data of 171 Syrian paediatric patients. HBsAg, anti-HBs, anti-HBc total

Table 1 - Serology results (numbers and percentages) of refugee children.

Number (n) and percentage (%)	HBsAg		Anti-HBs		Anti-HCV		Anti-HIV		Anti-HAV IgG	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Positive	6	4.2	74	52.8	2	1.8	2	2.2	41	47.7
Negative	134	95.8	66	47.2	107	98.2	86	97.8	45	52.3
Total	140	100	140	100	109	100	88	100	86	100

data of 140 patients (81.9%); anti-HCV data of 109 patients (63.8%); anti-HIV data of 88 patients (51.5%); and HAV IgG data of 86 patients (50.3%) were reached. Distribution of the results of Hepatitis B and C serology among the refugees is reported in Table 1.

■ DISCUSSION

Chronic HBV infections are usually asymptomatic in children. Chronic HBV infections were determined in approximately 3-12% of the paediatric population in Turkey [4]. Infants born to hepatitis B carrier mothers have a 60-90% possibility of becoming chronic HBV carriers [5, 6]. If not well followed and treated, carrier children have a risk of developing chronic hepatitis and HCC later on in their lives [5, 6]. In Turkey, all infants are routinely vaccinated at 0, 1, and 6 months to prevent transmission through contact with infected blood, body fluids and contact through sexual intercourse during postnatal childhood and adolescence, as recommended by World Health Organisation (WHO). According to an investigation by the Turkish Health Statistics Institute into the effects of vaccination on incidence, the incidence rate fell from 1.9% to 0.6% in the 6-19 age group with vaccinations [2]. Recent studies found that the seroprevalence of HBsAg in 0-18 age group in Turkey varied between regions and ranged between 1-12% [7].

The rate of HBV becoming chronic in regions where HBV infections are endemic has been shown to be similar to the country of origin in the case of settling in another country. The carrying of infections through migration is encountered more frequently in regions with low endemicity such as Canada, Australia and Western European countries [2].

According to studies in blood banks carried out by the Syrian Ministry of Health, HBV seroprevalence was 2.66% and the vaccination rate was

83% in 2008; whereas seroprevalence has been 1.75% and the vaccination rate has been determined as 69% since 2011 when the war broke out. Furthermore, vaccinations could not be routinely performed in certain regions [8, 9]. In our study, HbsAg positivity was observed to be higher and anti-Hbs positivity was lower in Syrian refugee children. These results are considered to be due to Syrian refugee children generally living in poor physical environment with their families of low socioeconomic and sociocultural level; HBV prophylaxis not being able to be routinely carried out in all regions of Syria during the birth of children with a HBV infected mother; and migration particularly from regions where paediatric vaccinations were not routinely followed after war.

The hepatitis C virus may lead to acute and chronic hepatic disorders. As HCV infection is asymptomatic and becomes chronic by 85%, it may also lead to liver cirrhosis and HCC. In Turkey, HCV infections are the most common cause of HCC after hepatitis B. HCV may be transmitted sexually or parenterally (with IV drug use, tattoos, circumcision, piercings, blood transfusions), and in children it is most frequently transmitted vertically from an infected mother to her infant. Throughout the world, 11 million children are infected with HCV [10]. The prevalence in children and adults is estimated to be 0-1% in Turkey and 1-2% in Syria [8, 11]. A preventive vaccine has not yet been developed against HCV. In our study, the seroprevalence of anti-HCV in Syrian children was determined to be higher than the data in Turkey. These results are thought to be caused by the prevalence of HCV-infected individuals being higher in Syria, insufficient treatment of HCV, and not being taken necessary precautions during birth.

As of 2013, 36.7 million people have been diagnosed HIV positive around the world, 1.4 million of which are pregnant and 3.4 million of which are children [12]. Antiretroviral therapy was provided to 67% of HIV positive pregnant women

in developed or developing nations. According to studies, a 58% reduction has been seen in new infections in children since 2001 [12]. In children, HIV is most commonly transmitted from an infected mother to her infant (vertically) and is less frequently transmitted through contact with infected blood and body fluids (percutaneously). Vertical transmission occurs during pregnancy, birth and breast-feeding. Furthermore, transmission occurs in 15% of births without any interventions to children born to mothers infected with HIV [13]. The possibility of HIV transmission from a mother to infant may be reduced to 1% with C-section births, HIV scanning in pregnant women, beginning antiretroviral prophylaxis in infants born to HIV-infected mothers, not breast-feeding and regular follow-ups [14]. In studies conducted in Turkey, the seroprevalence of anti-HIV has been established as 1% in the 0-18 years range [15]. In our study, the positivity of anti-HIV seroprevalence in Syrian refugee children has been found to be similar to Turkish children. The similarity of results may be related to intravenous drug use, homosexuality and the practice of multiple sexual partners being less frequent in adult populations in Syria.

The clinical course of HAV infections is asymptomatic in the paediatric age group, however it is more severe in the adult age group. HAV mostly spreads by the faecal-oral route. The HAV vaccine was included in the routine vaccination schedule for children in Turkey in 2012. A decrease is observed throughout the years in the seroprevalence of anti-HAV IgG during childhood and the possibility of acute HAV symptoms decrease in adults by increasing conformity to hygiene rules, providing easier access to clean water sources and improving socioeconomic level [16-21]. Along with there being differences among regions in Turkey, the seroprevalence of anti-HAV IgG was determined to be 15-72% in different age groups within the studies [22-30].

The seroprevalence of anti-HAV IgG may reach up to 100% in childhood in undeveloped or some developing nations [31, 32]. The report published by the WHO in 2013 reported a significant increase in the seroprevalence of HAV in association with the increasing difficulty in accessing clean water sources and poor living conditions in Syria [33]. Anti-HAV IgG seroprevalence is thought to be higher in Syrian refugee children compared to

other children in Turkey as they live in crowded families, cannot access clean drinking water, and do not live in hygienic conditions. In our study, anti-HAV IgG seroprevalence was determined as 47% in refugee children. This result was found to be higher than the Western regions of Turkey and similar to the Eastern Anatolia and Southeastern Anatolia regions of Turkey. This similarity is thought to stem from the regional similarities in living and health conditions.

■ CONCLUSION

As a result of our study, the seroprevalence of HAV, HCV and HIV in Syrian refugee children was found to be similar to those in Turkish children; however, HBsAg positivity was more frequent and the anti-HBs positivity was found to be less frequent.

Although our study was a retrospective study, the medical history and risk factors of patients could not be obtained and therefore, there were shortcomings in the patients' data. The presence of patients who have hepatitis in their families and the enrolment of only patients who were admitted to the hospital may not accurately reflect the serological profile of all Syrian refugee children.

According to these results, educating refugee children and their families and screening the at-risk group will reduce the transmission of HAV, HBV, HCV and HIV, and will prevent children from having these infections in the future. At the same time, it will be possible to treat patients with infectious diseases following diagnosis, thus the morbidity and mortality due to these diseases will be reduced. The HAV and HBV vaccination schedule to be implemented will prevent the infection of children with these diseases in adulthood, and will thus prevent consequences such as fulminant hepatitis, hepatic cirrhosis and HCC which may develop in the future.

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