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Comparison of hepatitis B surface antigen, anti-hepatitis B surface, and anti-hepatitis C virus prevalence in Syrian refugee pregnant women and Turkish pregnant women

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SUMMARY

OBJECTIVE: In this study, we aimed to determine and compare hepatitis B surface antigen level, anti-hepatitis B surface, and anti-hepatitis C virus positivity in Turkish pregnant women and Syrian refugee pregnant women residing in Turkey.

METHODS: The study was conducted on Syrian refugee pregnant women aged 15–45 years and Turkish pregnant women who applied to state hospital's gynecology and obstetrics outpatient clinics between April 30, 2012, and April 30, 2022. In our study, 136,376 pregnant women (104,629 Turkish and 31,747 Syrian) tested for hepatitis B surface antigen, 72,035 pregnant women (53,070 Turkish and 18,965 Syrian) tested for anti-hepatitis B surface, and 120,611 pregnant women (92,514 Turkish and 28,097 Syrian) tested for anti-hepatitis C virus were included. The patients were divided into six groups for hepatitis B surface antigen, anti-hepatitis B surface, and anti-hepatitis C virus results based on their age: <20 years, 20–24 years, 25–29 years, 30–34 years, 35–39 years, and >40 years. For each age group, the results of Syrian refugee pregnant women and Turkish pregnant women were compared.

RESULTS: Hepatitis B surface antigen positivity and anti-hepatitis B surface positivity were significantly higher in Turkish pregnant women compared to Syrian refugee pregnant women. Anti-hepatitis C virus positivity was significantly higher in Syrian refugee pregnant women compared to Turkish pregnant women.

CONCLUSION: Based on the available data, we think that hepatitis B surface antigen, anti-hepatitis B surface, and anti-hepatitis C virus tests should be done routinely for pregnant women. Raising awareness among Syrian refugees about the hepatitis B virus vaccine as well as encouraging them to be vaccinated may reduce the negative impact of migration.

KEYWORDS: Hepatitis B. Hepatitis B Surface Antigens. Hepatitis C. Prevalence.

INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are one of the important public health problems worldwide. It has been reported that approximately 2 billion individuals are infected with HBV and approximately 257 million are chronic carriers[1]. In the classification of countries according to hepatitis B surface antigen (HBsAg) prevalence, regions below 2% are considered low endemic areas, those with 2–10% have moderate endemicity, and those above 10% are considered high endemic areas. Turkey falls under the category of moderate endemic areas[2]. While the prevalence of HBV is 0.1% in Ireland, it can be as high as 16.7% in the Philippines and 4.9% globally[3]. In our country, the prevalence of HBV varies between 1.2 and 19.2% depending on the region, and the overall prevalence seems to be 4%[4]. It has been reported that approximately 50 million individuals are diagnosed with HBV every year worldwide and almost half of them acquire the virus in the prenatal period[5]. Intrauterine, intrapartum, and postpartum periods are possible vertical transmission pathways for hepatitis B infection during the perinatal period. While the prevalence of HBsAg in pregnancy is reported to be 0.6–5.8% worldwide, there are studies reporting the prevalence of HBsAg in pregnant women between 1% and 4.3% in our country[6-9].

It is estimated that approximately 210 million individuals worldwide are infected with HCV and 2–3 million new cases are identified every year[10,11]. Similar to HBV infection, the prevalence of HCV infection significantly varies according to geographical regions. It has been reported that the prevalence is 0.4% in developed countries and 12.5% in Egypt[12]. Globally, the prevalence of HCV in pregnant women is 8%, and perinatal transmission in infants born to HCV-infected mothers ranges from 2.7 to 8.4%[13].

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Owing to the civil war that started in Syria in 2011, numerous Syrians had to flee their country and many of those who left settled in Turkey. As of 2022, there have been approximately 3,652,000 Syrians in Turkey. While the estimated population of the city, Kahramanmaraş Province, in 2022 is approximately 1,180,000, it is known that there are approximately 100,000 Syrians who have registered in this city. It is inevitable that large-scale migrations of societies will lead to changes in the prevalence of infectious diseases[14]. In this study, we aimed to contribute to the existing literature by comparing the prevalence of HBsAg, anti-HBs, and anti-HCV in Turkish pregnant women and Syrian refugee pregnant women. It was aimed to know the prevalence of hepatitis B and hepatitis C in pregnant women and to reduce the diseases and deaths that can be caused by viruses by taking the necessary precautions.

METHODS

The study data were obtained and retrospectively reviewed from the information management system of obstetrics and gynecology outpatient clinics of the state hospital in Kahramanmaraş Province between April 30, 2012, and April 30, 2022. Syrian refugee pregnant women and Turkish pregnant women aged 15–45 years who applied to the obstetrics and gynecology outpatient clinics and those who were recommended for HBsAg, anti-HBs, and anti-HCV tests during these applications were included in our study.

In total, 136,376 pregnant women included in the study who were tested for HBsAg were divided into two groups: 104,629 Turkish pregnant women and 31,747 Syrian refugee pregnant women. HbsAg test results were compared according to age groups. Approximately 72,035 pregnant women tested for anti-HBs were divided into two groups: 53,070 Turkish pregnant women and 18,965 Syrian refugee pregnant women. The anti-HBs results were compared according to the age groups of Turkish pregnant women and Syrian refugee pregnant women. Some 120,611 pregnant women tested for anti-HCV were divided into two groups: 92,514 Turkish pregnant women and 28,097 Syrian pregnant women.

Patients were divided into six groups for HBsAg, anti-HBs, and anti-HCV results according to their age: <20 years, 20–24 years, 25–29 years, 30–34 years, 35–39 years, and >40 years. For each age group, the results of Syrian refugee pregnant women and Turkish pregnant women were compared.

The study was conducted in accordance with the Declaration of Helsinki and followed the ethical standards of the country of origin, Turkey. The research was submitted to the Clinical Research Ethics Committee of the Faculty of Medicine, Kahramanmaraş Sütçü İmam University (dated 22.04.2022 and No. 2022/08-04).

The data obtained in the study were statistically analyzed using the SPSS version 22.0 software (SPSS Inc., Armonk, NY, USA). The conformity of the data to normal distribution was evaluated using the Kolmogorov-Smirnov test. Descriptive statistics were expressed as number (n), percentage (%), and median values. For group comparisons, the Pearson chi-square test was used. A value of $p<0.05$ was considered statistically significant.

RESULTS

In total, 136,376 pregnant women included in the study who were tested for HBsAg were divided into two groups: 104,629 Turkish pregnant women and 31,747 Syrian refugee pregnant women. HBsAg test results were compared according to age groups. When all age groups were compared, HBsAg positivity was significantly higher in Turkish pregnant women compared to Syrian refugee pregnant women (1.1% vs. 0.9%, $p<0.005$) (Table 1).

Table 1. Comparison of hepatitis B surface antigen results of Syrian refugee pregnant women and Turkish pregnant women according to the age (Kemal Hansu).

Age (years)	Turkish pregnant women		Syrian refugee pregnant women		p-value
	HBsAg positive		HBsAg positive		
	n/N	Percentage	n/N	Percentage	
<20	65/8,694	0.7	13/5,144	0.3	**<0.05**
20–24	225/28,932	0.8	41/10,072	0.4	**<0.05**
25–29	309/28,036	1.1	82/6,730	1.2	0.42
30–34	314/21,790	1.4	77/4,525	1.7	0.19
35–39	172/12,533	1.3	46/4,437	1.0	0.09
>39	76/4,644	1.6	21/839	2.5	0.09
Total	1,161/104,629	1.1	280/31,747	0.9	**<0.05**

n: number of HBsAg positive patients; N: number of total patients. Bold indicates statistically significant p-values.

About 72,035 pregnant women who were tested for anti-HBs were divided into two groups: 53,070 Turkish pregnant women and 18,965 Syrian refugee pregnant women. When all age groups were compared, anti-HBs positivity was significantly higher in Turkish pregnant women compared to Syrian refugee pregnant women (31 vs. 19.4%, p<0.05) (Table 2).

About 120,611 pregnant women who were tested for anti-HCV were divided into two groups: 92,514 Turkish pregnant women and 28,097 Syrian pregnant women. When all age groups were compared, anti-HCV positivity was significantly higher in the Syrian refugee pregnant women compared to the Turkish pregnant women (0.3 vs. 0.2%, p<0.05) (Table 3).

DISCUSSION

HBV is an infectious agent that can cause fibrosis, cirrhosis, and hepatocellular carcinoma. HBV transmission from an infected mother to the baby can occur during the intrauterine, intrapartum, or postpartum periods. In infants infected perinatally, HBV can become chronic at rates of up to 90%[15]. HCV affects 8% of pregnant women worldwide, and the perinatal transmission rate in infants born to HCV-infected mothers is between 2.7 and 8.4%. In this context, it is important to identify pregnant women who are HBsAg or anti-HCV positive before their delivery. HBV and HCV seroprevalence may differ between countries, as well as in different regions within the same country. It is a well-known fact that large-scale migrations of populations will create differences in the epidemiology of infectious diseases. Accurate epidemiological assessments at the national level are important to accurately determine the current burden of diseases and the impact of existing interventions.

In our study, the prevalence of HBsAg was found to be 0.9% in the Syrian refugee pregnant women and 1.1% in Turkish pregnant women (p<0.05). In studies conducted on pregnant women in different regions of our country, HBsAg seroprevalence was reported between 0.66 and 4.3%[7-9,13,16]. Similar to our study, in the study conducted by Bahat et al., the prevalence of HBsAg was found to be 1.8% in Turkish

Table 2. Comparison of anti-hepatitis B surface results of Syrian refugee pregnant women and Turkish pregnant women according to the age (Kemal Hansu).

Age (years)	Turkish pregnant women		Syrian refugee pregnant women		p-value
	Anti-HBs positive		Anti-HBs positive		
	n/N	Percentage	n/N	Percentage	
<20	3,171/5,161	61.4	1,112/3,551	31.3	**<0.05**
20–24	7,194/15,699	45.8	1,191/7,119	16.7	**<0.05**
25–29	3,125/13,534	23.7	697/3,366	20.7	**<0.05**
30–34	1,275/10,637	11.9	352/2,914	12.0	0.90
35–39	1,115/5,843	19	245/1,519	16.1	**<0.05**
>39	622/2,196	28.3	88/496	17.7	**<0.05**
Total	16,502/53,070	31	3,685/18,965	19.4	**<0.05**

n: number of anti-HBs positive patients; N: number of total patients. Bold indicates statistically significant p-values.

Table 3. Comparison of anti-hepatitis C virus results of Syrian refugee pregnant women and Turkish pregnant women according to the age (Kemal Hansu).

Age (years)	Turkish pregnant women		Syrian refugee pregnant women		p-value
	Anti-HCV positive		Anti-HCV positive		
	n/N	Percentage	n/N	Percentage	
<20	15/7,557	0.2	17/4,852	0.4	0.1
20–24	40/25,670	0.2	16/9,552	0.2	0.8
25–29	50/24,730	0.2	16/6,355	0.3	0.44
30–34	32/19,124	0.2	10/4,249	0.2	0.34
35–39	31/11,184	0.3	8/2,297	0.3	0.56
>39	6/4,249	0.1	4/793	0.5	**<0.05**
Total	175/92,514	0.2	71/28,097	0.3	**<0.05**

n: number of anti-HCV positive patients; N: number of total patients. Bold indicates statistically significant p-values.

pregnant women and 1.1% in Syrian pregnant women[16]. In Gencer's study comparing Syrian refugees and Turkish people in Bursa province, the prevalence of HBsAg in Syrian refugees was 2.5% and that in Turkish people was calculated as 4.7%[17]. However, in both studies, the seropositivity rates in Turkish and refugee pregnant women appear to be higher than in our study. Considering the fact that studies are conducted in varied regions and refugee densities differ, such a result is expected. In a study conducted by Mutlu and Yılmaz in Düzce Province in 2019, comparing the prevalence of HBsAg in Turkish and refugee pregnant women, the prevalence of HBsAg was found to be 0.66% in Turkish pregnant women and 0.87% in the refugee pregnant women[13]. In the mentioned study, although HBsAg positivity in Syrian pregnant women was higher than in our study, it was reported that the positivity rate was not statistically significant. This outcome could have been caused by the study's small patient population, according to Mutlu and Yilmaz. In a study conducted in our province comparing foreign women of reproductive age and Turkish residents between 2014 and 2017, the prevalence of HBsAg was reported to be 1.1% in both groups[18]. Although the prevalence of HBsAg in the Turkish population was the same as in our study, the reason for the lower prevalence in foreign women may be the study's inclusion of a population other than pregnant women.

In our study, the prevalence of anti-HBs was found to be statistically significantly higher in Turkish pregnant women compared to Syrian pregnant women; this result was consistent with other studies (31 vs. 19.4%, p<0.005). According to Mutlu and Yılmaz, the prevalence of anti-HBs was reported to be 22.4 and 38.4% in Syrian and Turkish pregnant women, respectively. Conversely, in the study by Bahat et al.[13,16], the prevalence of anti-HBs was 11 and 26.3% in Syrian and Turkish pregnant women, respectively. As per data from previous studies, it is observed that the rate of vaccination of Turkish pregnant women against HBV is higher than Syrian pregnant women. In 1981, the HBV vaccine was developed; however, owing to the high cost of the vaccine and the varied health policies of countries, it was not simultaneously administered in every country. When pregnant women under 20 years of age are compared, it is noticed that the anti-HBs positivity in Turkish pregnant women is almost twice than that of Syrian pregnant women. Although this situation may reflect the difficulties experienced by the Syrian people in terms of vaccination owing to the civil war that started in Syria in 2011 or the perception that vaccination is neglected, the fact that anti-HBs positivity is lower in Syrian pregnant women in all age groups except the 30–34 age group may be the result of socio-cultural differences and vaccination policies of the Syrian government.

There are studies demonstrating that anti-HCV positivity is between 0.08 and 1.1% in different regions of our country[7,13,16,19]. In our study, anti-HCV positivity was significantly lower in Turkish pregnant women compared to Syrian refugee pregnant women (0.2 vs. 0.3%, p<0.05). In a study, similar to our study, anti-HCV positivity was found to be 0.06% in Turkish pregnant women and 0.43% in refugee pregnant women, whereas, in another study, anti-HCV positivity was reported to be 0.4% in Turkish people and 1.2% in refugees[13,17]. However, unlike our study, Bahat et al. determined in their study that anti-HCV positivity was higher in Turkish pregnant women compared to refugee pregnant women, but the difference was not statistically significant (0.2 vs. 0.1%, p=0.241)[16]. In our study, when we attempted a comparison according to age groups, we observed that the difference was significant above the age of 39 years and not statistically significant in pregnant women younger than 39 years of age.

Owing to the retrospective nature of our study, the inability to obtain the medical history of patients, the inability to differentiate between vaccination or previous infection, and the lack of access to postnatal data constitute the limitations of our study; however, to the best of our knowledge, it has the advantage of being the study with the largest patient population in our country.

CONCLUSION

Based on the current data, we suggest routine testing of pregnant women for HBsAg, anti-HBs, and anti-HCV. Raising awareness among Syrian refugees about the HBV vaccine and encouraging them to be vaccinated may reduce the negative impact caused by migration.

ETHICAL APPROVAL

The study was approved by Kahramanmaras Sutcu Imam University Faculty of Medicine Clinical Researches Ethics Committee with the ethical committee decision dated April 22, 2022, and numbered 2022/08-04 and from Kahramanmaraş Provincial Health Directorate dated 03.06.2022 and numbered 20121. The study was conducted in accordance with the Declaration of Helsinki and followed the ethical standards of the country of origin, Turkey.

AUTHORS' CONTRIBUTIONS

KH: Data curation, Funding acquisition, Investigation, Project administration, Resources, Software, Supervision, Validation, Writing – original draft. **IGC:** Conceptualization, Formal Analysis, Methodology, Visualization, Writing – review & editing.

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