

# SURVEILLANCE FOR HEPATITIS B VIRUS INFECTION IN PREGNANT WOMEN IN GREECE SHOWS HIGH RATES OF CHRONIC INFECTION AMONG IMMIGRANTS AND LOW VACCINATION-INDUCED PROTECTION RATES: PRELIMINARY RESULTS OF A SINGLE CENTER STUDY

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Epidemiological data on the prevalence of serological markers of hepatitis B virus (HBV) infection in pregnant women in Greece are limited. We evaluated the prevalence of HBV serological markers in a multinational population of pregnant women in Athens, Greece. The overall prevalence of hepatitis B surface antigen (HBsAg) was 4.1% with the highest rates among Albanian immigrants (12%). Relatively low vaccination-induced protection rates (32.5%) were observed, a finding suggesting that surveillance and immunisation programmes targeted at pregnant women are necessary.

### Background

Worldwide, about 350 million people are chronically infected with hepatitis B virus (HBV). Vertical (mother-to-infant) transmission of the infection occurs usually in perinatal period and is responsible for the majority of the disease burden in endemic areas. The risk of vertical transmission generally depends on the level of maternal infectivity during pregnancy, i.e. the presence of hepatitis B e-antigen (HBeAg) or HBV DNA levels [1,2].

Hepatitis B has long been a serious public health problem in Greece. Historically, Greece used to have the highest burden of HBV infection in the European Union, and an early hepatitis B prevention programme introduced in 1982 and aimed at high-risk groups had had little impact on disease incidence or prevalence [3]. More recent HBV vaccination programmes, demographic and socioeconomic changes, safer medical and nursing practices and screening of blood donors have resulted in a significant decline in chronic HBV infection in our country in the past decade [3,4]. However, the arrival of a great number of refugees, especially from countries with endemic HBV infection, is likely to have influenced this trend, requiring a reevaluation of epidemiological data. To date, epidemiological data on the prevalence of serological markers of HBV infection in pregnant women in Greece have been limited [5].

### HBV prevalence in pregnant women

In our study we examined the current prevalence of HBV serological markers in a multinational population of pregnant

women in Athens, Greece. Between September 2008 and December 2008 a total of 749 pregnant women (mean age 28.5 years) who gave birth at the Department of Obstetric and Gynaecology of the Maternal and Perinatal Hospital 'Elena Venizelou' of Athens were prospectively evaluated. Hepatitis B surface antigen (HBsAg), hepatitis B e-antigen (HBeAg), antibody to hepatitis B e-antigen (anti-HBe), antibody to hepatitis B core antigen (anti-HBc) and antibody to hepatitis B surface antigen (anti-HBs) were detected using routine commercially available enzyme immunoassays (Abbott Laboratories, Abbott Park, Illinois, US). All women in the study population were screened for HBsAg, anti-HBc and anti-HBs, whereas HBeAg and anti-HBe were evaluated only in those who tested positive for HBsAg [HBsAg(+)].

The study was performed in accordance with the Helsinki Declaration and was reviewed and approved by the Hospital Ethics Committee.

Almost half of the study population was originally from Greece (370/749, 49.4%), 29% came from Albania (217/749), 12.8% (96/749) from Eastern European countries (Russia, Romania, Bulgaria), 5.2% (39/749) from Asian countries (Philippines, India and China) and 3.6% (27/749) from African countries (Egypt, Nigeria, Kenya). The place of origin of each woman included in the study population was determined on the basis of her and/or her parents' birth place (in case of second generation immigration), according to the medical records data. The proportion of each group in the study population is presented in Figure 1. It is important to note the small proportion of women from Asia and Africa in our study population and that the majority of these came from countries with intermediate HBV prevalence.

Overall, 4.1% (31/749) of women were HBsAg(+) and the vast majority of them (26/31, 83.87%) were Albanian. The prevalence of HBV serological markers in the study population, according to the place of origin, is presented in Figure 2. Among Albanian women the prevalence of HBsAg was 12% followed by 2.1% among women from Eastern European countries. The prevalence of HBsAg

among women of Greek origin (0.8%) was very low and significantly lower in comparison with the mean value of the studied population ( $p < 0.001$ ). It is important to note that none of the women from countries of Asia and Africa were HBsAg(+). A significant proportion of young women from Asia and Africa who live and work in Greece are second generation immigrants and the majority of them were born in our country, in contrast to Albanian or Eastern European women. Moreover, as previously noticed, the majority of Asian and African women of our study population were from countries with intermediate HBV prevalence. Both factors could explain the discrepancy between the levels of HBV serological markers among Asian/African and Albanian/Eastern European women, in our study.

Overall, only 1.4% of HBsAg(+) women were also HBeAg(+) whereas the vast majority (98.6%) were HBeAg(-)/antiHBe(+). Despite that, it is well known that a significant proportion of HBeAg(-) chronic HBV infected women in our country exhibit high levels of viremia during the perinatal period, especially due to precore mutation of the HBV genome [6]. More than half (57.1%) of the Albanian women exhibited anti-HBc seropositivity followed by Eastern European women (28.1%), Asian women (17.9%) and African women (11.1%) whereas only 5.1% of Greek women presented serological markers of previous HBV exposure. Moreover, serological markers of past HBV infection with spontaneous recovery [antiHBc(+) and antiHBs(+)] were observed in 15.2% of the whole study population whereas 32.5% exhibited vaccination-induced protection [characterised by the presence of isolated antiHBs(+)].

Importantly, vaccination-induced protection rates were relatively highest and comparable among Albanian and Greek women (40.3% vs 33.8% respectively,  $p = 0.115$ ) whereas significantly lower rates were found among Eastern European (22.9%), Asian (15.4%) and African (11.1%) women ( $p < 0.05$ , in all comparisons).

### Conclusion

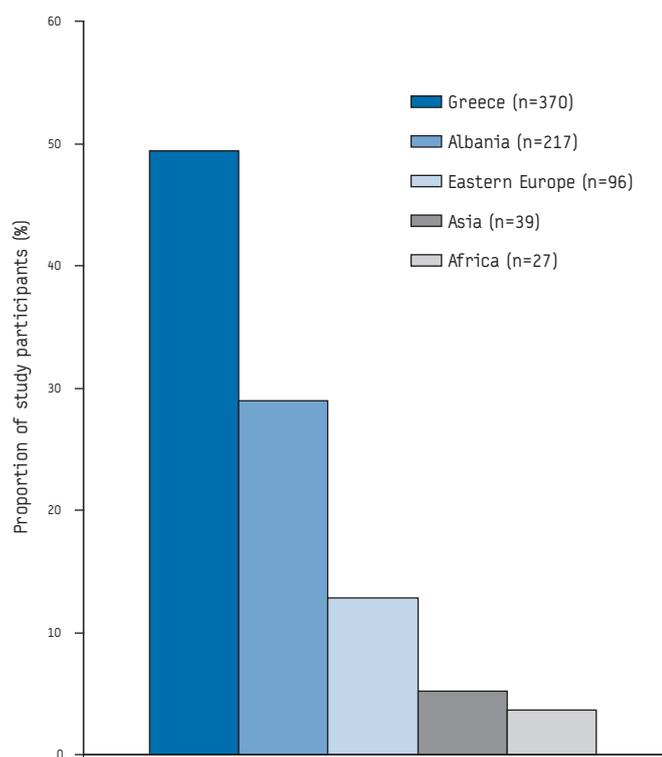
In the study described in this paper the overall prevalence of HBsAg among pregnant women in Greece was estimated to be 4.1% with highest rates among Albanian immigrants (12%). The HBeAg(-)/antiHBe(-) serological status was observed in the vast majority of HBsAg(+) women in our study population. Relatively low vaccination-induced protection rates (32.5%) were observed, a finding suggesting that surveillance and immunisation programmes targeted at pregnant women are necessary in order to avoid vertical transmission of HBV infection.

### References

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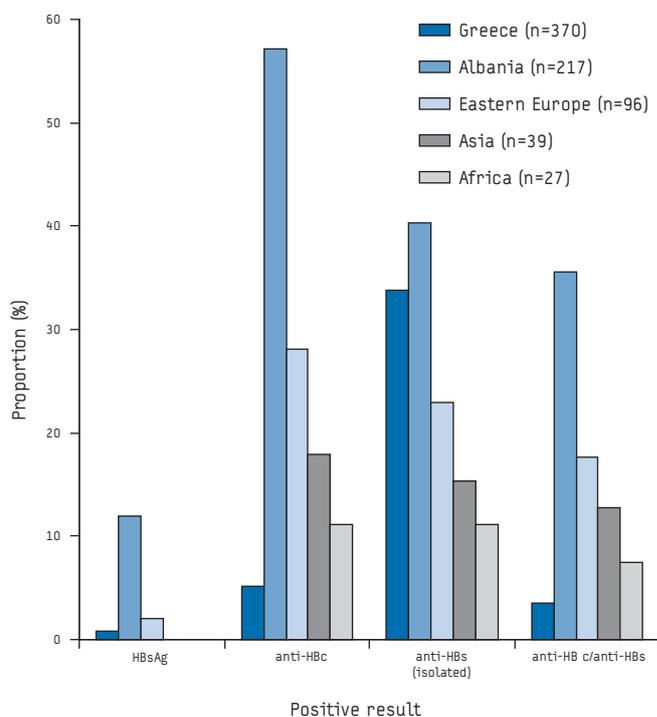
**FIGURE 1**

**Study on prevalence of serological markers of hepatitis B virus infection among pregnant women in Greece - distribution of the study population by place of origin (n=749)**



**FIGURE 2**

**Prevalence of serological markers of hepatitis B virus infection among pregnant women in Greece, according to their place of origin (n=749)**



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