

RESEARCH NOTE

HEPATITIS B AMONG PREGNANT WOMEN ATTENDING HEALTH CARE FACILITIES IN RURAL BANGLADESH

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Abstract. This study assessed hepatitis B prevalence among pregnant women attending health care facilities in rural Bangladesh. Blood samples were collected from 480 participants. HBsAg was positive in 0.4% of subjects, anti-HBc was positive in 21.5% and anti-HBs was positive in 8.5% of subjects. HBsAg was more prevalent among the older age group. Hepatitis B has a low prevalence among pregnant women in rural Bangladesh. Existing hepatitis B vaccination schedule in the Expanded Program on Immunization (EPI) to vaccinate the children in rural Bangladesh is appropriate.

Keywords: hepatitis B, pregnant women, rural area, Bangladesh

INTRODUCTION

Hepatitis B is a global public health problem. About two billion people have been infected with hepatitis B virus (HBV) worldwide and more than 350 million people are estimated to be chronically infected (WHO, 2008). HBV related liver diseases are the ninth leading cause of death worldwide resulting in one million deaths every year (Nester *et al*, 2009).

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HBV infection among pregnant women is an important issue since many newborn infants contract this infection from their infected mothers. Intrauterine infection with HBV may lead to perinatal transmission (Xu *et al*, 2002). Intrapartum screening is important to diagnose asymptomatic patients who have HBV infection and whose HBsAg status is not known (Petermann *et al*, 1995).

In Bangladesh, particularly in rural areas, it is difficult to screen for HBsAg among pregnant women to assess the risk for vertical transmission of HBV which is crucial to assess the effectiveness and appropriateness of the existing childhood hepatitis B vaccination regimen under

Table 1
General characteristics of the pregnant women study subjects (N=480).

| Variable | Total |
|--|--------------------------------|
| Age in years Mean (SD); Median (min-max) | 21.7 (\pm 2.68); 20 (18-32) |
| Age group, number (%) | |
| \leq 20 years | 254 (52.9) |
| 21-25 years | 195 (40.6) |
| >25years | 31 (6.5) |
| Educational attainment, number (%) | |
| No formal education | 122 (25.4) |
| Primary | 274 (57.1) |
| Secondary and above | 84 (17.5) |
| Parity, number (%) | |
| Nuliparous | 248 (51.7) |
| Primiparous | 214 (44.6) |
| Multiparous | 18 (3.7) |

the Expanded Program on Immunization (EPI) in rural Bangladesh. We carried out this study at two health care facilities in rural Bangladesh.

MATERIALS AND METHODS

All healthy pregnant women attending the Upazila Health Complex and Smiling Sun Clinic, Gobindaganj, Gaibandha, Bangladesh from July 2010 to September, 2010 were invited to participate in the study. A total of 480 pregnant women participated in the study during this period. After obtaining written informed consent, 5 ml of venous blood was collected from each study subject and was separated and the serum was stored at -20°C until being sent to the laboratory where the tests were performed. Ethical approval was obtained from the National Research Ethics Committee, Bangladesh Medical Research Council, Dhaka, Bangladesh and the Ethics Committee of the Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand.

Laboratory analysis

Laboratory testing was performed at the Institute of Epidemiology Disease Control and Research (IEDCR), Dhaka, Bangladesh. Third generation enzyme linked immunosorbant assay (ELISA) methods were followed using commercially available ELISA kits (For HBsAg: Auto Bio, Autobio Diagnostics, UK; for HBeAg and anti-HBc: Enzo Biochem, Famingdale; and for anti-HBs: Jaj International, San Diego, CA). Tests were repeated for all HBsAg positive samples and 10% of other positive and negative samples.

Statistical analysis

STATA (College Station, TX) version 8 was used to carry out the statistical analysis.

RESULTS

Table 1 shows the general characteristics of the study participants. More than half (52.9%) of the subjects were \leq 20 years old, 40.6% were aged 21-25 years, and 6.2% were aged > 25 years. The median

age was 20 years, the minimum age was 18 years and the maximum was 32 years. One hundred twenty-two subjects (25.4%) had no formal education, 274 (57.1%) had completed primary level education and 84 (17.5%) had completed secondary or higher level of education. Two hundred forty-eight (51.7%) were nulliparous, 214 (44.6%) were primiparous and 18 (3.7%) were multiparous.

One hundred three subjects (21.5%) had been infected (presence of anti-HBc) with hepatitis B virus. Two subjects (0.4%) had a positive HBsAg, but neither of these two were HBeAg positive. Of the 103 subjects positive for anti-HBc, 19 were positive for both anti-HBc and anti-HBs, indicating immunity acquired from previous infection. On the qualitative test for anti-HBs 41 subjects (8.5%) were positive for anti-HBs, indicating they were immune either by natural infection (both anti-HBc and anti-HBs present) or by vaccination (only anti-HBs present). Of the 41 subjects positive for both anti-HBc and anti-HBs, 22 (4.6%) were positive only for anti-HBs, confirming the vaccine induced antibodies against hepatitis B. Anti-HBc was found present among 84 subjects (17.5%) suggesting four possibilities in interpreting the hepatitis B status of those women: 1) recovery of HBV infection with undetectable anti-HBs, 2) false positive anti-HBc, 3) current infection with HBV without detectable HBsAg, and 4) resolving acute infection with HBV. The two women who were positive for HBsAg were in the < 20 years old age group and had a primary level of education.

DISCUSSION

A wide range in HBsAg prevalence among the pregnant women has been

seen in different countries of the world (Merrill and Hunter, 2011), and in different regions of the same country (Batham *et al*, 2007). Studies from around the world have found the prevalences of HBsAg among pregnant women varies from 0.1% to 25.3% (Ndumbe *et al*, 1992; Salleras *et al*, 2009). A similar HBsAg prevalence was seen in the USA in the early 1990s (Desheda *et al*, 1995).

HBsAg prevalence was not consistent with three previous studies from Bangladesh (Akhter *et al*, 1992; Rumi *et al*, 1998; Francisco *et al*, 1999). Those studies were conducted more than a decade ago. The current HBsAg prevalence in Asia is different (Andre, 2000). Some studies suggest the prevalence of hepatitis B among pregnant women in India is declining (Vargesh *et al*, 2004, Chatterjee *et al*, 2009). In this study, the overall infection rate (presence of anti-HBc) of HBV among pregnant women was much lower than the study conducted by Francosis *et al* in 1999 indicating a lower HBV infection rate in rural Bangladesh at present. This declining rate among pregnant women may be due to the success of a health education program regarding prevention of HBV infection and the introduction of disposable syringes.

Molecular assays were not performed in cases where blood samples were positive for anti-HBc only, which was a limitation of this study.

In conclusion, HBV infection has a low prevalence among pregnant women in rural Bangladesh indicating a low risk of vertical transmission. The existing hepatitis B vaccination regimen in the current EPI program is appropriate for rural Bangladesh. Further research should be carried out in other parts of the country to compare regional variations in HBsAg prevalence.

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