The Prevalence and Risk Factors for Hepatitis B Surface Ag Positivity in Pregnant Women in Eastern Region of Ghana

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Background/Aims: The aim of this study was to evaluate the prevalence and risk factors for hepatitis B surface antigen (HBsAg) positivity in pregnant Ghanaian women. Methods: We surveyed 1,500 pregnant women in Eastern region of Ghana. Direct interviews were performed by trained nurses using standardized questionnaires. Pregnant women were screened for human immunodeficiency virus (HIV) and hepatitis B infections, hemoglobin levels and sickle cell anemia as part of the antenatal check-up. Results: The overall HBsAg positive rate was 10.6%, which varied among districts (13.8% for Kwahu West, 12.4% for Upper Manya, and 2.2% for Yilo Krobo). HBsAg positivity was significantly higher in women with depression (odds ratio [OR], 3.74; 95% confidence interval [CI], 2.13 to 6.57) and HIV (OR, 2.03; 95% CI, 1.06 to 3.89). Age, education, and gravidity were not related to HBsAg positivity. Anti-hepatitis B immunoglobulin for newborns of HBsAg-positive mothers is provided as part of routine vaccination schedule starting at 6 weeks of age. Conclusions: To prevent mother-to-child transmission of hepatitis B, screening tests for HBsAg in pregnant women and hepatitis B vaccination of newborns immediately after birth need to be performed in this region. (Gut Liver 2012;6:235-240)

Key Words: Hepatitis B; Ghana; Pregnant women; Risk factors; Prevalence

INTRODUCTION

It has been reported that general health state in Eastern Ghana is lower than that of other areas in the same country. In 2009, the life expectancy at birth of Ghanaian men and women are 57 and 64 years respectively, with under-five mortality rate (probability of dying by age 5 per 1,000 live births) reaching 69, a per capita total expenditure on health (PPP int. $) was $122 and total expenditure on health as a percentage of gross domestic product was 8.1% in 2009 according to World Health Organization (WHO) statistics. However, it was $100 in Eastern Ghana. The number of physicians per 10,000 is 0.85 in Ghana, and Eastern region is lower than this in 2009. Sub-Saharan Africa including Ghana is a highly endemic area of hepatitis B, reaching up to approximately 90% carrier rate in some rural areas. The hepatitis B prevention strategy of WHO states that routine infant immunization is required for all countries and additional vaccination is needed in accordance with every country’s epidemiological characteristic. Hepatitis B virus (HBV) birth dose (vaccination in 24 hours) is recommended for countries with hepatitis B surface antigen (HBsAg) prevalence higher than 8%. Currently, an average Ghanaian receives vaccination routinely as part of the pentavalent vaccine including diphtheria, pertussis, tetanus, and haemophilus influenza type b at 6, 10, and 14 weeks after birth, respectively, but not immediately after birth. It is established that the main HBV transmission path of Sub-Saharan Africa is horizontal, but attention also needs to be given to the vertical transmission considering previous reports that most of the HBV infected children of this area was infected before the age of five. Under these circumstances, maternal and child health services is vital, yet little information is available on HBsAg prevalence of pregnant Ghanaian women. The more pregnant women are exposed to HBV, the higher the risk of vertical transmission which in turn keeps hepatitis B endemic.
This study sought to investigate the HBsAg prevalence, as well as risk factors for its transmission amongst pregnant women in Eastern region of Ghana. Finally, the study aimed at suggesting practical alternatives of HBV prevention.

**MATERIALS AND METHODS**

Between December 2008 and March 2009, data was collected from 1,500 pregnant women who visited three hospitals in Eastern region of Ghana. The Eastern region occupies a land area of 19,323 km and constitutes 8.1% of the total land area of Ghana. The population of Eastern region was 2.3 million in 2008 which was 9.8% of Ghanaian population and three study districts occupied 10.8% (0.25 million) of the Eastern region (Fig. 1).

In three study districts of Eastern region, there were three hospitals; Holy Family Hospital (HFH) in Kwahu West district, Asesewa Government Hospital (AGH) in Upper Manya Krobo district, and Somanya Polyclinic (SPC) in Yilo Krobo district. HFH was an old general hospital established in 1945, has 3 doctors and assisted by a number of professional doctors who visit the hospital regularly. While AGH was new district hospital, there was only one physician. In Yilo Krobo district including SPC, there were no physicians.3 Aside from these hospitals there are also rural health centers; Reproductive & Child Health (RCH) or Community-based Health and Planning Services (CHPS). Public health workers are assigned in RCH or CHPS. Pregnant women visit RCH or CHPS to antenatal care or urgent delivery.

We have trained nurses of three hospitals and they directly interviewed the pregnant women. After signing a written informed consent, all the subjects responded to a questionnaire, which composed of six sections: general information, current pregnancy, pregnancy history, concerns, health care utilizations, and health examinations. They were screened for blood pressure, blood sugar, anemia, HBsAg, human immunodeficiency virus (HIV), and sickle cell anemia. Hemoglobin levels less than 10 g/dL was determined to be anemic. HIV was identified by HIV rapid antibody test performed using OraQuick Rapid HIV-1/2 and confirmed with First Response manufactured by OraSure Technology Inc. (Bethlehem, PA, USA) and Premier Medical Co., Ltd. (Daman, India), respectively. HBsAg was done using serum with Accu-Tell® HBsAg Strip manufactured by Accu Bio Tech Co., Ltd. (Beijing, China).

The Institutional Review Board of the Eulji University Hospital approved the study protocol (IRB 08-38). Permission was sought from the Eastern Regional Health Directorate of the Ghana Health Service and written informed consent for use of questionnaires and medical records for research purposes was obtained from every study participant.

We analyzed correlation between HBsAg positive women and estimated risk factors using cross-tabulation, and confirmed validity through chi-square test. Only the statistically significant variables were used to constitute the variable model, which was then analyzed using multiple logistic regression model. All the statistical analyses were run on SPSS version 18.0 (IBM, New York, NY, USA).

**RESULTS**

1. **HBsAg positive rate by general characteristics**

The mean HBsAg positive rate for these subjects was 10.6%. It was different by the districts (p<0.001). The HBsAg positive rates of AGH and HFH were 12.4% and 13.8%, respectively, which were higher than that of SPC’s (2.2%). There were no significant age-related differences, but there was a significant difference according to education level of the subjects. Only 7.7% of those who received primary education were positive for HBsAg, but among those who received education at secondary school or higher, 14.1% proved to be HBsAg positive. There was no statistically significant difference in gravidity (Table 1).

2. **HBsAg positive rate by self-reported social support and mental health status**

The pregnant women who answered ‘yes’ to the question asking whether they felt unsafe in their houses showed a higher HBsAg positive rate (p=0.042). No significant HBsAg positive rate difference existed depending on hunger, which was re-