Risk Factors for Hepatitis B Surface Antigen Positivity Among Pregnant Women

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Abstract

A case-control study of risk factors for hepatitis B surface antigen (HBsAg) positivity was carried out among 130 pregnant women who were HBsAg positive (the case group) and 284 pregnant women who were HBsAg negative (the control group). Data obtained from the interviews and medical records including socio-demographic factors, personal history and behavioral factors related to HBV infection of the case and control groups were analyzed by using Odds ratio (OR), 95 per cent confidence interval of OR and χ^2- test. The results revealed that the significant risk factors for HBsAg positivity were (a) a history of jaundice, OR=3.83 (p=0.0044), (b) tattooing, OR=3.98 (p= 0.0411), (c) a history of jaundice in husbands, OR=7.93 (p<0.0001), (d) sharing articles with their husbands, such as a toothbrush, a spoon or a drinking glass, OR=5.90 (p<0.0001), (e) duration of marriage more than 4 years, OR=1.58 (p=0.0446) and (f) average sexual relations ≥ 2 times per week, OR=2.12 (p=0.0007). The HBV preventive program should emphasize not only HBV vaccination in spouses of HBV carriers or pre-marital couples, but also health education for improving personal hygiene and sexual behavior in these target groups.

Key word : HBsAg, Risk Factors, Pregnant Women

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Hepatitis B virus (HBV) infection and its complications including chronic hepatitis, cirrhosis and hepatocellular carcinoma are important public health problems in many countries[1]. The prevalence of HBV carriers has a wide global variation. In countries of Asia and South-East Asia where the prevalence of HBsAg carriers is 8-15 per cent and 70-95 per cent of the population have serological evidence of previous infection are classified into the high endemicity of HBV infection[2,3]. The remaining parts of the world fall into intermediate endemicity and low endemicity with HBsAg prevalence of 2-7 per cent and less than 2 per cent, respectively[4]. By the year 2000, more than 2,000 million people world-wide had been infected with HBV and approximately 400 million of them were HBsAg carriers [5]. Almost one third of the carriers will develop cirrhosis or hepatocellular carcinoma, which is one of the world's most common cancers[6,7]. The lifetime risk for a HBsAg-positive carrier dying from either cirrhosis or its complications is calculated to be as high as 50 per cent, whereas, this risk is less than 2 per cent in an HBsAg-negative individual. A prospective study of 22,707 men in Taiwan showed that the relative risk of primary hepatocellular carcinoma for an HBV carrier compared to a non-carrier was 223[2]. Annually, approximately 500,000 to 1 million people die of HBV-related liver diseases[8].

Previous studies in Thailand showed the prevalence of 5-10 per cent of HBsAg carriers[9,10], but the trend has decreased in recent years[11,12]. The transmission of HBV includes blood transfusion, injecting drug use, sexual contact, neonatal exposure and others[13-15]. Although, the mother-to-child transmission has been considered to be the most important route for HBV infection[15,16], the infants can be protected by hepatitis B immunoglobulin (HBIG) and HBV vaccine. In older children and adults, the transmission is mediated principally by person-to-person or horizontal transmission[14, 17,18]. The spouses may acquire HBV infection from their infected partners. A recent study by the authors revealed that the prevalence rate of HBV marker among spouses of HBsAg-positive women was significantly higher than that of HBsAg-negative spouses, $p<0.001$[19]. The evidence supported that the prevention of HBV sexual transmission among married couples should be emphasized. Risk factors or risk behaviors of HBV carriers should be clarified as a guideline for developing some education programs to reduce the HBV transmission among married couples and sexually active couples.

MATERIAL AND METHOD

Study design and study population

This study was a case-control study conducted among pregnant women aged 16-44 years who attended the antenatal care clinic of Rajvithi Hospital in Bangkok from October 1998 to March 1999. There were 130 pregnant women who tested HBsAg positive by an ELISA (Behring Enzynost Test Kit, Behring Diagnostics Incorporated, Germany with 100% sensitivity and 99.8% specificity); and 284 HBsAg negative pregnant women who were selected as the control group. Before their blood specimens were collected, the subjects were requested to sign the informed consent forms. Some socio-demographic data, personal history and behavioral factors related to HBV infection were carried out by structured questionnaires. Results of VDRL and anti-HIV antibody testing were collected from medical records.

Data analysis

Data obtained from interviews and medical records of the 2 groups were analyzed for risk factors of HBsAg positivity by using odds ratio (OR), 95 per cent confidence interval of OR and the Chi-square test or Fisher's exact test. The statistical significance of risk factors was a p-value less than 0.05.

RESULTS

General characteristics of the case and control groups

Approximately 87 per cent of the cases and 84 per cent of the controls were 16-30 years of age. About 50 per cent of both groups finished only primary education. Approximately 54 per cent of the cases and 56 per cent of the controls were housewives. Most of the subjects came from the north-eastern and the central regions of Thailand (73.18% and 74.99%, respectively). Only 35.39 per cent of the cases and 34.50 per cent of the controls had a family income more than 10,000 baht per month.

Risk factors for HBsAg positivity in pregnant women

Socio-demographic factors

The details of socio-demographic factors in the case group and the control group were compared.

The results revealed that there was no significant difference in socio-demographic factors for HBsAg positivity among the study subjects, p>0.05, Table 1.

Personal history and behavioral factors

Some personal history and behavioral factors between the case group and control group were analyzed. It was found that the significant risk factors for HBsAg positivity were (a) a history of jaundice, OR=3.83 (p=0.0044), (b) tattooing, OR=3.98 (p=0.0411), (c) a history of jaundice in husbands, OR=7.93 (p<0.0001), (d) sharing articles with their husbands, such as a toothbrush, a spoon or a drinking glass, OR=5.90 (p<0.0001), (e) duration of marriage more than 4 years, OR=1.58 (p=0.0446), and (f) average sexual relation ≥ 2 times per week, OR=2.12 (p=0.0007). Details are shown in Table 2. After analyzing by multiple logistic regression, only a history of jaundice in husbands was a significant risk factor for HBsAg positivity among the pregnant women, OR=4.83 (95% Confidence interval of OR=1.63-17.22, p=0.0026).

DISCUSSION

It is clear that not only vertical transmission but also horizontal transmission is an important route of HBV infection. Known risk factors for acquiring HBV infection, such as tattooing, ear piercing in females, sharing scissors during haircutting, direct contact with wounds or blood or blood products from other persons, sharing toothbrushes or spoons or drinking glasses with other persons and sexual activity have been previously reported[13-15]. This case-control study showed that 6 factors of personal history and health behavior including a history of jaundice, tattooing, jaundice in husbands, sharing articles with their husbands, duration of marriage more than 4 years and average sexual relations ≥ 2 times per week were significant risk factors for HBsAg positivity among the studied pregnant women. Some factors, such as a history of jaundice, tattooing and sharing things with their husbands supported previous studies, whereas the present study showed factors including history of jaundice in husbands, duration of marriage more than 4 years and average sexual relations twice or more per week to be risk factors that might increase the horizontal transmission of HBV, especially sexual transmission.

The authors could not identify socio-demographic risk factors for HBsAg positivity, although some factors including age, sex and marital status were found in previous studies [14,20,21]. A tattoo is an important risk factor for blood-borne infections like HBV infection, HIV/AIDS and HCV infection[22-24]. At present, a tattoo may decrease the role of blood-borne transmission because of the

Table 1. Risk factors for HBsAg positivity among pregnant women: Socio-demographic factors.

Socio-demographic Factors	No. of HBsAg-positive women	No. of HBsAg-negative women	Odds ratio (95% CI of OR)	P-value from χ^2 test
Age (years)				
16-30	113	238	1.28 (0.68, 2.45)	0.5010
31-45	17	46	1.00	
Education				
≤ Secondary level	116	240	1.38 (0.69, 2.78)	0.4106
≥ College, University	14	40	1.00	
Occupation				
Agriculture, labourer	37	84	1.01 (0.60, 1.66)	0.9046
Officer, business	23	41	1.27 (0.68, 2.37)	0.5067
Housewife	70	159	1.00	
Domicile				
North, Northeast	78	166	1.07 (0.68, 1.66)	0.8495
Others	52	118	1.00	
Family income/month (Baht)				
≤ 10,000	84	186	0.96 (0.61, 1.52)	0.9499
> 10,000	46	98	1.00	

Table 2. Risk factors for HBsAg positivity among pregnant women: Personal history and behavioral factors.

Personal history and Behavioral factors	No. of HBsAg-positive women	No. of HBsAg-negative women	Odds ratio (95% CI of OR)	P-value from χ^2 test or Fisher's exact test
History of jaundice				
Yes	13	8	3.83 (1.44, 10.42)	0.0044*
No	117	276	1.00	
History of blood transfusion				
Yes	10	9	2.55 (0.93, 7.02)	0.0737
No	120	275	1.00	
History of drug injection				
Yes	5	4	2.80 (0.59, 14.32)	0.1467
No	125	280	1.00	
Tattooing				
Yes	7	4	3.98 (1.01, 18.83)	0.0411*
No	123	280	1.00	
Ear piercing				
Yes	118	249	1.38 (0.66, 2.93)	0.4509
No	12	35	1.00	
History of STDs				
Yes	8	10	1.80 (0.63, 5.08)	0.3373
No	122	274	1.00	
Result of VDRL				
Reactive	6	10	1.33 (0.59, 6.34)	0.7938
Non-reactive	124	274	1.00	
Result of anti-HIV				
Positive	7	8	1.96 (0.59, 6.34)	0.2555
Negative	123	276	1.00	
History of jaundice in husbands				
Yes	19	6	7.93 (2.93, 24.78)	< 0.0001*
No	111	278	1.00	
Sharing wares with husbands				
Sometime	110	137	5.90 (3.38, 10.40)	< 0.0001*
Never	20	147	1.00	
Duration of marriage				
> 4 years	59	98	1.58 (1.01, 2.46)	0.0446*
≤ 4 years	71	186	1.00	
Average sexual relation per week				
≥ 2 times	67	95	2.12 (1.36, 3.30)	0.0007*
0-1 time	63	189	1.00	

*Statistic significance at $\alpha = 0.05$

use of sterile needles and equipment for tattooing. Sharing articles, such as a toothbrush or a drinking glass, especially with carriers were risk factors for infections transmitted by saliva including HBV infection[13,14]. Another group of risk factors, such as a history of jaundice in husbands, duration of marriage more than 4 years and sexual relations averaging twice or more per week increased the risk of HBV carrier state by sexual transmission. There is no doubt that sexual activity is an important risk factor for the transmission of HBV and HIV. A recent report on HIV infection in Thailand showed that almost 50 per cent of newly infected HIV cases involved transmission between husbands and their wives[25]. The authors' previous study in postpartum women and their husbands showed that HBV seromarker prevalences among spouses of HBsAg-positive postpartum women were significantly higher than HBsAg-negative spouses[19]. More sexual activity with HBV carriers increased the risk of HBV transmission due to the higher rate of exposure in semen [26]. These findings supported the role of sexual transmission of HBV and the risk of developing HBV infection among married couples.

To reduce the sexual transmission of HBV and the risk of developing HBV carrier state among married couples, a premarital counseling program including premarital blood screening, HBV vaccination in HBV seronegative couples and integrated health education for preventing diseases transmitted by sexual contact, blood-borne and mother to child should be emphasized. Moreover, other risk behaviors including tattooing and sharing spoons and drinking glasses, especially their spouses should be reduced by personal hygiene education. The changing of behavior is very difficult and takes a long time. Individual health education with face to face discussion(27) should be provided in premarital counseling clinics.

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การศึกษาเปรียบเทียบเพื่อวิเคราะห์ปัจจัยเสี่ยงต่อการตรวจพบแอนติเจนเอสของไวรัสตับอักเสบ บี ในหญิงตั้งครรภ์

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การศึกษาเปรียบเทียบเพื่อวิเคราะห์ปัจจัยเสี่ยงต่อการตรวจพบแอนติเจนเอสของไวรัสตับอักเสบ บี (HBsAg) ในหญิงตั้งครรภ์ ได้ดำเนินการในหญิงตั้งครรภ์ที่มีผลเลือด HBsAg บวก จำนวน 130 ราย และหญิงตั้งครรภ์ที่มีผลเลือด HBsAg ลบ จำนวน 284 ราย โดยเก็บข้อมูลด้านสังคมประชากร ประวัติส่วนบุคคลและพฤติกรรมเสี่ยงต่อการติดเชื้อไวรัสตับอักเสบ บี จากการสัมภาษณ์และรายงานการตรวจร่างกายทางการแพทย์ วิเคราะห์ข้อมูลโดยใช้ Odds ratio (OR), 95% Confidence interval of OR และ χ^2-test ผลการศึกษา พบว่า ปัจจัยเสี่ยงต่อภาวะการเป็นพาหะของไวรัสตับอักเสบ บี ในหญิงตั้งครรภ์ ได้แก่ (ก) ประวัติตัวเหลืองตาเหลือง, OR=3.83 (p=0.0044), (ข) การสัก, OR=3.98 (p=0.0411), (ค) ประวัติตัวเหลืองตาเหลืองในสามี, OR=7.93 (p<0.0001), (ง) การใช้ของส่วนตัวบางอย่างร่วมกับสามี เช่น แปรงสีฟันช้อนและแก้วน้ำดื่ม, OR=5.90 (p<0.0001), (จ) ช่วงเวลาที่สมรสมากกว่า 4 ปี, OR=1.58 (p=0.0446), และ (ฉ) ความถี่ของการมีเพศสัมพันธ์ ตั้งแต่ 2 ครั้ง/สัปดาห์ขึ้นไป, OR=2.12 (p=0.0007) ตามลำดับ ดังนั้นโครงการป้องกันภาวะพาหะไวรัสตับอักเสบ บี จึงควรให้สุขศึกษาเพื่อลดพฤติกรรมเสี่ยงควบคู่กับการสร้างเสริมภูมิคุ้มกันโรคในคู่สมรสหรือก่อนสมรส

คำสำคัญ : ปัจจัยเสี่ยง, พาหะไวรัสตับอักเสบ บี, หญิงตั้งครรภ์

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