

ANTENATAL SCREENING FOR HEPATITIS B IN PREGNANT WOMEN

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Summary

Two thousand healthy asymptomatic, pregnant women attending rural and urban antenatal clinics in coastal Selangor were screened for hepatitis B infection. 78 (3.9%) were found to be HBsAg positive, of which 15 were HBeAg positive. No statistical difference in the hepatitis B carrier rate was found among the women when stratified by location, race or age ($p > 0.05$). Only the subgroup of pregnant Chinese women from rural areas were found to be at higher risk of being carriers, compared to those from urban areas ($p < 0.01$). Indications for routine antenatal screening of pregnant women for hepatitis B infection are discussed.

Key words : Hepatitis B, antenatal screening, carrier rate

INTRODUCTION

In Asian countries where there is a high prevalence of HBsAg carriers, the incidence of asymptomatic carrier mothers has been reported to vary from 3% to 15%.¹ Transmission of the hepatitis B virus (HBV) from these asymptomatic carrier mothers to their offsprings during the perinatal period is believed to be the predominant mode of transmission of HBV in Asia.² Various studies have shown that the vertical transmission rate varies between 40% to 50% in high prevalence areas.³ However, when the carrier mothers are also positive for HBeAg, a marker that is well correlated with specific DNA polymerase, activity and indicative of active viral replication, transmission rates of 85% to 100% have been recorded.²

In Malaysia, the HBsAg carrier rate of asymptomatic blood donors is between 2% to 10%. Hence, one expects a similar carrier rate amongst pregnant women who, to date, are still not routinely screened for HBV markers. The objectives of this study are to determine (1) the magnitude of HBsAg carrier rate in pregnant women, and (2) whether there is a need for routine antenatal screening of pregnant women for hepatitis B.

MATERIALS AND METHODS

Between December 1985 and August 1986, a total of 917 consecutive blood samples were collected from healthy, asymptomatic pregnant women attending the antenatal clinics in the **Tengku Ampuan Rahimah** General Hospital, Klang, as well as those in surrounding Health Centres. Similarly, 1083 samples were

collected from those attending the antenatal clinics of the Banting and Tanjong Karang District Hospitals as well as surrounding Health Centres. The blood samples were collected from women attending the clinics for the first time during that particular pregnancy, irrespective of parity or duration of gestation. Women with any complications of pregnancy requiring hospitalisation were excluded from the study. Samples with insufficient patient data or gross contamination were rejected. The blood samples were primarily collected for routine VDRL testing, but the serum from each sample was aliquoted for HBsAg testing, using the reverse passive haemagglutination method (Green Cross). Samples that were found positive for HBsAg were confirmed by RIA (in G.H.K.L.) when sufficient serum were available. The positive samples were then further tested for HBeAg and Anti-HBe, using the same method. The results were analysed by location, race and age distribution. Variance between categories was analysed by Chi square and Fisher's exact test.

RESULTS

1. Approximately 4% of the pregnant women screened were asymptomatic carriers of HBsAg (Table 1).
2. HBsAg carriers were found in all age groups in this study, from below 20 years to above 40 years of age. Interestingly, none of the sixteen Orang Asli women ("others") included in this study carried the HBsAg (Tables 2 & 3).
3. Though the rural figures appeared to be higher than those of urban areas, no statistical difference in the HBsAg carrier

rate was detected by location ($p > 0.05$), race ($p > 0.05$) or age groups ($p > 0.10$). However, rural Chinese women were at higher risk of being carriers, compared to urban Chinese women ($p < 0.01$).
 4. Of the 78 HBsAg carriers (Table 4), 15 (19%) were positive for HBeAg and 19

(24%) were positive for Anti-HBe. These figures are comparable to those of HBsAg carriers in Japan and China.' In addition, there was no statistical difference in the HBeAg positivity rate between the rural and urban HBsAg carriers ($p > 0.10$).

TABLE 1
 HBsAg CARRIERS IN PREGNANT WOMEN

	Urban	Rural	Total
Number screened	917	1083	2000
Number positive	27	51	78
% positive	2.9%*	4.7%*	3.9% (average)

* (Chi square : $p > 0.05$)

TABLE 2
 HBsAg SCREENING IN PREGNANT WOMEN (TAR GH KLANC)
 AGE AND ETHNIC DISTRIBUTION

Race		Age (Yrs)						Total
		Q 20	21-25	26-30	31-35	36-40	≥ 41	
MALAY	Total	44	143	146	91	54	14	492
	No. +ve	2	5	3	1	3	0	14 (2.8%)
CHINESE	Total	24	90	86	34	20	2	256
	No. +ve	2	4	4	2	0	0	12 (4.7%)
INDIAN	Total	18	72	46	24	6	1	167
	No. +ve	0	0	1	0	0	0	1 (0.6%)
OTHERS	Total	-	-	2	-	-	-	2
	No. +ve	-	-	0	-	-	-	0 (0%)

Total number of pregnant women screened : 917
 Total number positive for HBsAg : 27(2.9%)

TABLE 3
HBsAg SCREENING IN PREGNANT WOMEN (D.H. & H.C.)
AGE AND ETHNIC DISTRIBUTION

Race		Age (Yrs)						Total
		≤ 20	21-25	26-30	31-35	36-40	≥ 41	
MALAY	Total	51	199	210	115	76	14	665
	No. +ve	3	6	7	7	5	1	29 (4.4%)
CHINESE	Total	27	76	68	49	5	2	227
	No. +ve	4	7	5	3	0	0	19 (8.4%)
INDIAN	Total	21	72	50	25	9	0	177
	No. +ve	0	1	2	0	0	0	3 (1.7%)
OTHERS	Total	3	4	2	4	1	0	14
	No. +ve	0	0	0	0	0	0	0 (0%)

Total number of pregnant women screened : 1083
 Total number positive for HBsAg : 51 (4.7%)

TABLE 4
HEPATITIS B MARKERS IN PREGNANT WOMEN
DISTRIBUTION BY LOCATION

Marker	Number Positive		Total
	Urban	Rural	
HBsAg	27	51	78
HBeAg	3+	12+	15 (19.2%)
Anti-HBe	3	16	19 (24.4%)

+ (Fisher's exact test : $p > 0.10$)

DISCUSSION

From this study, there exists a problem of asymptomatic HBsAg carriers among pregnant women, with a rate as high as that of blood donors. From experience in hepatitis screening of blood donors, the reverse passive haemagglutination (RPHA) method is a less sensitive method for HBsAg detection, compared to either EIA or RIA methods. It is fairly specific, with a low false positive

rate of 1% to 2%. Therefore the actual HBsAg carrier rate could be much higher than that found in this study.

To determine whether routine and effective screening of hepatitis B in pregnant women is recommended, one has to examine the criteria for screening relating to the disease and the screening tests used.

Criteria relating to the disease

1. Hepatitis B is a serious illness which is worthwhile to screen for. It has many complications in the acute and chronic phases. Many of the afflicted persons remain asymptomatic chronic carriers who are prone to develop chronic liver diseases such as cirrhosis and hepatocellular carcinoma.
2. Prevalence of hepatitis B carrier state in pregnant women is fairly high (3.9%) with one fifth of them positive for HBeAg. It is thus worthwhile to screen for hepatitis B. By comparison, antenatal screening programme for syphilis is already in existence and the current prevalence of syphilis in pregnant women is only 1.4% (TAR GH, Klang, 1986).

3. The natural history of transmission of hepatitis B has been well investigated and worked out. Studies have shown that transmission occurs mainly during labour and delivery, with a smaller proportion occurring during the intrauterine period.⁴ By the first six months of life, 70% to 80% of babies born to HBeAg positive mothers have detectable HBs antigenemia,^{2,5} with a large proportion of them developing the chronic carrier state which may persist into adult life.^{5,6}
4. For effective screening, there must be a latent phase of the disease which is of appreciable duration, during which it is recognisable by the screening tests to be applied. The pregnancy period represents the latent phase of hepatitis B infection in neonates at risk. This period fulfils the above criterion of being easily identifiable and assessable by screening tests.
5. Preventive intervention of perinatal transmission of HBV in neonates is much more practical and desirable than later treatment of chronic carrier state in infected infants. This is because there is no known treatment to eradicate the carrier state at present. By this criterion, screening of pregnant women is necessary in order to identify those neonates at risk, to whom preventive intervention can be instituted. To date, the only practical preventive measure available is immunization of the newborns. Convincing data on combined use of passive and active immunization, with effective reduction in the perinatal transmission rate, are available.^{1,7} It is thus worthwhile to screen pregnant women in order to allow for timely intervention at birth.

Criteria relating to screen tests

1. Hepatitis B screening tests require not more than 1 ml. of serum which can be aliquoted from the blood samples collected for antenatal VDRL screening already in existence. This collection of blood is well accepted by pregnant women, and it poses no extra hazard, discomfort or inconvenience to them.
2. All the three types of commercial test kits (RPHA, EIA, RIA) available for HBV markers testing are reliable, as they are mainly objective tests in nature, with minimal instrument and subjective error.
3. The ideal test to be selected for screening should have high sensitivity and specificity.

However, in practice, a cheap, sensitive but less specific test is acceptable as an initial screening test so long as a more expensive but highly specific test is available to confirm the true positives. This may be applicable here as the prevalence of hepatitis B carrier in pregnant women is relatively high. Further studies are needed to look into these aspects to select a test suitable for mass screening.

In conclusion, screening of pregnant women for hepatitis B is indicated, as most of the above criteria for screening are satisfied. However, the chief obstacle to routine screening is not just the cost of the screening tests, but also the high costs of selective immunization of neonates at risk. For this reason, one could only advocate screening if favourable cost-effectiveness of such programmes are demonstrable. Data looking into long term benefits and effectiveness of such programmes are forthcoming. It is therefore recommended that thorough evaluation of such data be carried out before routine screening is implemented.

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