

---

## SHORT PAPER

# The declining HBsAg carriage rate in pregnant women in Hong Kong

---

L. C. KWAN<sup>1</sup>, Y. Y. HO<sup>2</sup> AND S. S. LEE<sup>1\*</sup>

<sup>1</sup> *Viral Hepatitis Preventive Service, Department of Health, Hong Kong*

<sup>2</sup> *Regional Health Office (Hong Kong), Department of Health, Hong Kong*

(Accepted 28 May 1997)

### SUMMARY

The HBsAg status and demographic data of 2480 pregnant women who attended antenatal clinics at Maternal and Child Health Centres in Hong Kong were collected by means of a self-administered questionnaire over a 1-week period in July 1996, to explore the underlying reason of a higher than expected HBsAg prevalence. Local women constituted 49·2% of the sample, mainland Chinese 39·7% and others 11·1%. The overall HBsAg prevalence was 10·0%. When related to place of birth, those born in Hong Kong had a prevalence of 8·4% whereas the prevalence of those born in mainland China was 13·1% ( $P < 0\cdot001$ ). The overall HBsAg carriage rate is high because of a higher rate in immigrants in the community. It is apparent that the HBsAg prevalence of local people in Hong Kong has been decreasing in the past decade. Overall, the current HBsAg carriage rate in the local adult population is estimated to have declined to about 8%.

Hepatitis B poses a major public health problem worldwide. The World Health Organization (WHO) estimates that 350 million people are carriers of hepatitis B virus (HBV). Up to 25% of these individuals may die prematurely because of long-term complications of chronic hepatitis B infection including cirrhosis and hepatocellular carcinoma [1, 2].

In China [3] and Hong Kong, mother-to-infant transmission is the major route of infection. One study on South East Asians indicated that up to 50% of HBV carrier mothers are hepatitis B e antigen positive [4], indicating high infectivity. Prevention of mother-to-child infection constitutes an important strategy in the public health control of the epidemic. In Hong Kong, babies born to carrier mothers in selected hospitals have been given HBV vaccine and immunoglobulin since 1983. The vaccination programme was subsequently extended to all newborn in 1988.

Apparently, the epidemiology of hepatitis B infection is changing over time. Current data [5] from different sources have suggested that the HBV carrier rate is declining in Hong Kong, probably as a result of the implementation of prevention programmes. However the observed prevalence of HBsAg in pregnant women has remained high compared to that in the community. This study was undertaken to examine the situation and explores the possible underlying reason for the discrepancy.

In Hong Kong, all pregnant women are regularly screened for HBV status when they attend the Department of Health's Maternal and Child Health Centres (MCHC) for antenatal care. An enzyme-linked immunosorbent assay for HBsAg is used by the Virus Unit of the Department of Health.

A set of questions was designed to collect demographic data from pregnant women attending the MCHC. A pilot study was conducted to test practicality and validity of the questionnaire. After the subjects had completed the questionnaire, they were interviewed face-to-face to check the validity of their

\* Author for correspondence: Dr S. S. Lee, Viral Hepatitis Preventive Service, 5/F, Yaumatei Jockey Club Clinic, Battery Street, Yaumatei, Kowloon, Hong Kong.

Table 1. *HBsAg prevalence of Hong Kong Chinese and mainland Chinese women by age group*

Age group (years)	Proportion (%) HBsAg positive		
	HK	China	All
15-19	0/33 (0)	0/9 (0)	2/47 (4.3)
20-24	12/156 (7.7)	23/132 (17.4)	38/373 (10.2)
25-29	35/436 (8.0)	52/379 (13.7)	91/910 (10.0)
30-34	44/460 (9.6)	36/331 (10.9)	85/851 (10.0)
> 35	11/135 (8.1)	18/134 (13.4)	31/299 (10.4)
Total	102/1220 (8.4)	129/985 (13.1)	247/2480 (10.0)

answers. The questionnaire was revised and the procedures for administering the questionnaire adjusted so as to ensure smooth running of the study.

During the study period between 8 and 13 July 1996, demographic data of all pregnant women who attended the MCHC antenatal sessions in the territory were collected by means of the self-administered questionnaire. They were requested to complete the questionnaire while waiting for counselling sessions. The name, age, place of birth, marital status, duration of marriage, duration of stay in Hong Kong, parity, hepatitis B vaccination history, and total monthly family income were recorded. The questionnaire could be completed in either Chinese or English. It was returned to MCHC medical staff after completion. Some subjects were contacted by telephone to clarify unclear responses in the questionnaire. Results of HBsAg were obtained from the Virus Unit of the Department of Health. Data were analysed by logistic regression model using SAS.

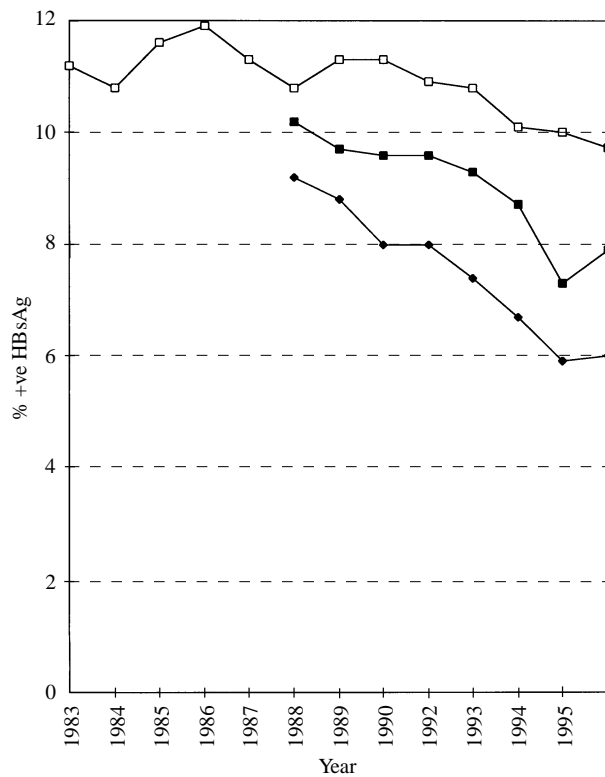
A total of 2751 questionnaires was distributed and 2514 (91.4%) were collected from 43 MCHCs during the study period. The HBsAg status could be traced in 2480 (90.1%) subjects, the data on whom were included in the analysis. The overall response rate was 90.1%. The 2480 women were aged between 16 and 44 years (mean = 29), 97.7% were married, and 56.6% had a total monthly family income of less than HK \$15000 (US \$1 = HK \$7.8). About half (1220, 49.2%) of the subjects were born in Hong Kong, 39.7% (985) in China and 11.1% (275) in other places.

The overall HBsAg prevalence of the study population was 10.0% (95% CI 8.8-11.2%) for all subjects. HBsAg was detected in 8.4% (95% CI 6.8-10%) of Hong Kong Chinese, 13.1% (95% CI 11-15.2%) of mainland Chinese and 5.8% (95% CI 4.4-7.2%) of other origins (mainly Asians). The age-specific HBsAg prevalence in mainland Chinese women was higher

than that of local women (Table 1). A majority of the Chinese women (504, 53.3%) had come to Hong Kong within 5 years prior to or during their current pregnancies. About 13% of local Chinese women and 10% of mainland Chinese women reported having received HBV vaccination. A logistic regression model, controlling for the effects of age and family income (< HK \$15000 vs. > 15000), showed a statistically significant association between place of birth and HBsAg prevalence with a coefficient (China vs. HK) of 0.49, standard error of 0.15,  $P < 0.001$  and odds ratio of 1.63 (95% CI 1.23-2.18). Duration of stay in Hong Kong and total monthly family income had no statistical significant effect on HBV carriage.

The HBsAg prevalence obtained through regular screening of prenatal women does not reveal the true picture of HBV carriage in the local community. The overall rate is high in pregnant women because of a higher carriage rate in immigrants in that group. The situation is similar to that of other developed countries [6-8], where a large proportion of HBV carriers are immigrants. Surveillance data in Hong Kong [5] showed that the prevalence of HBsAg in pregnant women has declined only slightly from 11.2% in 1983 to 9.7% in 1995. These figures are unexpectedly higher than the corresponding rates in other community groups (Fig. 1). Data from the Hong Kong Red Cross Blood Transfusion Service, for example, showed that the HBsAg prevalence in new blood donors ( $n \cong 40000$  yearly) has decreased from 9.2% in 1988 to 6.0% in 1995. Similarly, data from the Family Planning Association of Hong Kong confirmed that the HBsAg prevalence of their clients (both men and women,  $n \cong 18000$  yearly) of their Pre-Marital Package Service has decreased from 10.2% in 1988 to 7.9% in 1995. The HBsAg prevalence in local pregnant women (8.4%) obtained in this study is comparable to that of other sources of surveillance. Taking all these data together, it is estimated that the current HBV carriage in local general adult population has decreased to about 8% in 1996.

A number of factors might have contributed to the decline of HBV carriage rate in the past decade. First, the economic achievement of Hong Kong in the 1980s has resulted in more public spending on health services. Infection control practices have improved. The replacement of reusable syringes by disposable plastic syringes for injection in the early 1980s has prevented nosocomial infection due to contaminated needles. Second, the screening of blood donors for HBsAg since 1978 has prevented HBV infection due



**Fig. 1.** Trends of HBsAg prevalence in different groups [5] in Hong Kong. (Sources: Hong Kong Red Cross Blood Transfusion Service, Family Planning Association of Hong Kong and Department of Health.) □, Pregnant women; ■, premarital screening; ◆, new blood donor.

to transfusion. It had an important impact as about 10% of blood donors in Hong Kong were HBV carriers [9]. Third, the promotion of mass HBV vaccination to newborn since 1988 had an educational effect on HBV prevention in the general population. About 13% of local pregnant women had received HBV vaccination at their own expenses. Finally, the AIDS prevention programme, which was implemented in 1985, had modified the behaviours of certain at risk groups, including intravenous drug users, resulting in the decline of HBsAg prevalence at the same time.

An inference that can be drawn from our results is that the morbidity and mortality arising from chronic hepatitis B infection in Hong Kong may not decline rapidly in the coming years despite a genuine decline in HBV carriage in local people. The overall carriage rate is likely to remain comparatively high as the influx of immigrants with high HBV carriage rate continues. The number of female immigrants from China had increased steadily from 9559 in 1987 to 18274 in 1995. In 1995, 45986 Chinese residents came to settle in Hong Kong. Of these, 18274 (39.7%) were

wives, 23033 (50.1%) were children and 1572 (3.4%) were husbands of local residents (data from Immigration Department). The one-way permit quota agreed upon with the Chinese Government for legal immigration from China to Hong Kong has been 150 a day since 1 July 1995. However, children from China would not be able to benefit fully from Hong Kong's vaccination programme if they arrive after perinatal period. Both mother-to-infant and horizontal transmission are important routes for the spread of HBV in endemic areas like Hong Kong and China. Targeted intervention programmes may be required in order to better control the HBV infection in Hong Kong in the years to come.

#### ACKNOWLEDGEMENTS

The authors are grateful to all medical and nursing staff of Maternal and Child Health Centres, Department of Health for their support in the study, and also Prof. A. J. Hedly and Ms S. F. Chung for their expert advice.

#### REFERENCES

1. Beasley RP. Hepatitis B virus as the etiologic agent in hepatocellular carcinoma – epidemiologic consideration. *Hepatology* 1982; **2**: 215–65.
2. Beasley RP, Hwang LY, Lin CC, et al. Hepatocellular carcinoma and hepatitis B virus: a prospective study of 22,707 men in Taiwan. *Lancet* 1981; **ii**: 1129–33.
3. Yao JL. Perinatal transmission of hepatitis B virus infection and vaccination in China. *Gut* 1996; **38** Suppl 2: S37–8.
4. Wong WW, Minuk GY. A cross-sectional seroepidemiologic survey of chronic hepatitis B virus infections in Southeast Asian immigrants residing in a Canadian urban centre. *Clin Invest Med* 1994; **17**: 443–7.
5. The Scientific Working Group on Viral Hepatitis Prevention. Surveillance of viral hepatitis in Hong Kong – a report. Hong Kong: Department of Health, 1996: 8–17.
6. Mahoney, FJ, Lawrence M, Scott C, et al. Continuing risk for hepatitis B virus transmission among Southeast Asian infants in Louisiana. *Pediatrics* 1996; **6**: 1113–6.
7. Denis F, Tabaste JL, Ranger Rogez S. Prevalence of HBsAg in about 21,500 pregnant women. Survey at twelve French University Hospitals. The Multicentric Study Group. *Pathol Biol (Paris)* 1994; **42**: 533–8.
8. Lindh M, Norkrans G, Stenqvist K, et al. Hepatitis B carriers in Sweden – effects of immigration. *Scand J Infect Dis* 1993; **25**: 411–6.
9. Yeoh EK, Chang WK, Kwan JPW. Epidemiology of viral hepatitis B infection in Hong Kong. In: Lam SK, Lai CL, Yeoh EK eds. *Viral hepatitis B infection in the Western Pacific region: vaccine and control*. Singapore: World Scientific Publishing Co. Pte. Ltd. 1984: 33–41.