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Hepatitis B surface antigen sero-prevalence in a township in the north-eastern border region of Myanmar

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Viral hepatitis B is a major public health problem in Myanmar with a carrier rate of 9-11% in the general population. Although many reports on the prevalence of hepatitis B exist, little is known about the epidemiology of viral hepatitis B in the border regions of Myanmar. A community-based study was carried out on 349 subjects (age 1–70 years) from Muse Township, near the Myanmar-China border. The DMR HBsAg ELISA kit was used to detect the hepatitis B surface antigen (HBsAg) in the sera samples of the subjects. The overall prevalence rate of hepatitis B sero-positivity was 13.2%. There was no significant difference in hepatitis B sero-prevalence rates between males (13.9%) and females (12.7%). The HBsAg prevalence rate was significantly higher in 315 persons over the age of 10 years compared to 34 children below 10 years of age (14.6% vs 0%). Chinese subjects had the highest seropositive rate (24.1%) compared to Bamars (14.3%), Shans (13.7%), Kachins (10%) and Palaungs (8%). A significantly higher HBsAg seroprevalence rate was observed in those with tattoos (23.9% *vs* 11.5%, p=0.02). Higher prevalence rate of HBsAg was observed in a border town as compared to the general population.

INTRODUCTION

Hepatitis B virus (HBV) infection is an important health problem worldwide, because the infection can cause significant liver diseases that range from fulminating hepatitis to hepatocellular carcinoma. Globally, more than two billion people have been infected with HBV and 350 million of them became chronic as detected by the presence of hepatitis B surface antigen [1].

It has also been reported that there is a wide intra-national variation in the prevalence of HBV infection in different areas of the same country. The prevalence of HBV infection is consistently higher in rural rather than urban areas. There have been reports on the ethnic and gender differences [2].

Hepatitis B virus infection is hyper-endemic in Myanmar and is a major health problem in the country. The magnitude of the problem of hepatitis B infection in Myanmar was reported in a large-scale field study carried out in both lower and upper Myanmar where 10.4% of the study population was found to be sero-positive for hepatitis B surface antigen (HBsAg) [3].

Subsequent studies carried out among different population groups revealed HBsAg carrier rate of 10-12% [4]. However, these studies were carried out on populations residing in major cities of the country. Based on the information that a certain area in Myanmar had a relatively higher HBsAg sero-positivity rate than the national figure [5], intra-national differences in HBsAg sero-positivity could exist in Myanmar.

Moreover, there is no information on HBsAg carrier rates of populations residing in the border regions of the country. It is assumed that the HBsAg carrier rates of the neighboring countries would be more or less reflected on the populations residing across the border. This study was carried out with the aim of studying the epidemiology of hepatitis B infection in different regions of Myanmar and was carried out in Muse Township in the eastern border region of Myanmar near the Myanmar-China border.

SUBJECTS AND METHODS

A community based cross-sectional study was carried out in September 2002, on 349 subjects residing in Muse Township who agreed to participate in the study. The study population included 137 males and 212 females within the age range of 1-70 years. The study population included Bamars, Shans, Kachins, Palaungs and Chinese subjects residing in Muse Township. After obtaining voluntary consent, a pre-tested questionnaire was used to collect social and biological data from each subject. Clinical and family histories were carefully asked and recorded. Two milliliters of venous blood were collected from each subject. The sera samples were centrifuged at 3000 rpm for 10 minutes and stored at -20°C and transported to the Department of Medical Research (LM) on ice packs for determination of hepatitis B surface antigen (HBsAg) using the in-house DMR hepatitis B surface antigen ELISA kit according to the Instruction Manual [6]. Data entry and analysis was carried out using MINI TAB 14 Statistical Package, USA. Univariate analyze were carried out to describe the data and Chi squared tests were carried out to determine the bivariate differences.

RESULTS

Age, sex and study groups

Females constituted 60% of the study population. The mean age of the subjects was 29.37 $\pm$ 13.74 yrs. There was no significant difference in age of the male and female subjects (29.37 $\pm$ 13.74 years vs 29.37 $\pm$ 13.74 years). Of the study population, 46 subjects (19 males, 27 females) were found to be HBsAg positive. Thus, the overall HBsAg prevalence rate was found to be 13.2%. There was no significant difference in HBsAg sero-positivity between males (13.9%) and females (12.7%). The HBsAg prevalence rate was significantly higher (0% versus 14.6%, Chi square value 5.05, p = < 0.05) in persons over the age of 10 years (n= 315, 14.6%) compared to children below 10 years of age (n=34, 0%). None of the children aged 1-10 years and those older than 50 years of age had HBsAg sero-positivity. The HBsAg sero-prevalence rate was significantly higher in adults of 31-40 years of age compared to that of children under 10 years (21.4% versus 0%, Chi square 14.22, p= 0.014). HBsAg prevalence rates in different age groups are shown in Figure 1.

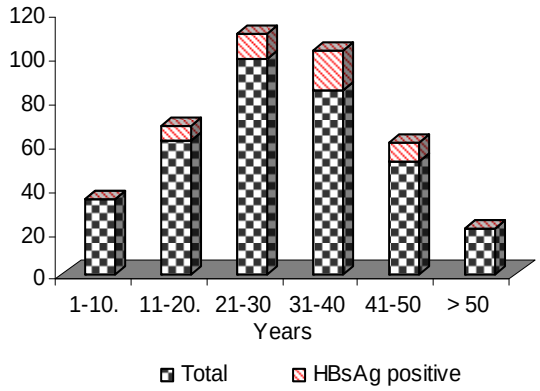

Fig. 1. Seropositivity of hepatitis B surface antigen by age groups

The HBsAg prevalence rate was 14.3% in Bamars, 13.7% among the Shan ethnic groups, 10% in Kachins, 7.9% in Palaungs and 7.1% in others. The highest prevalence rate of 24.1% was seen in Chinese subjects residing in Muse Township although they could not be classified as an ethnic group (Table 1).

Associated factors

The HBsAg sero-positivity rate was 23.9% in persons with tattoos and was significantly

Table 1. Hepatitis B surface antigen prevalence in study different groups

Study groups	Total	HBsAg (-)	HBsAg (+)	Percentage
Chinese	29	22	7	24.1
Bamar	77	66	11	14.3
Shan	131	113	18	13.7
Kachin	60	54	6	10.0
Palaung	38	35	3	7.9
Others	14	13	1	7.1
Total	349	303	46	13.2

higher compared to persons without tattoos (23.9% versus 11.6%, Chi Square value = 5.333, p = 0.021). In this study, there was no significant association of HBsAg sero-positivity with history of receiving blood transfusions (15.4% versus 12.9%), with surgical procedures (14.9% versus 12.5%) and liver disease (14.0% versus 13.0%). HBsAg sero-prevalence and associated factors are shown in Table 2.

Table 2. Associated factors of hepatitis B surface antigen (HBsAg) sero-prevalence among subjects residing in Muse Township

	Tattoo		Trans-fusion		Surgery		Liver disease	
	Yes	No	Yes	No	Yes	No	Yes	No
No. of subjects	46	303	39	310	101	248	50	299
HBsAg negative	35	268	33	270	86	217	43	260
HBsAg positive	11	35	6	40	15	31	7	39
Percentage	23.9	11.6	15.4	12.9	14.9	12.5	14	13

DISCUSSION

A wide variation of HBsAg prevalence rates has been reported by different authors, and the prevalence rates depended on different study populations and different geographical locations. The prevalence of chronic HBV infection is endemic in many countries of Asia and Africa and it has been estimated as 2.8% in developed countries and 7.6% in developing countries. HBV infection in the Asia-Pacific region is among the highest in the world, and chronic HBV infection in most of the countries of the Asia-Pacific region is high (>10% prevalence) [7]. In the Asia-Pacific region, the carrier rate was less than 1% in Australia and New Zealand, 1-5% in Japan, Singapore, India and Thailand, 6-10% in Bangladesh, Indonesia, northern China and more than 10% in Taiwan, Southern China, Korea, the Philippines and Micronesia [2].

The findings from this study showed that the overall HBsAg prevalence was 13.2% in Muse Township situated on the Myanmar-China border in the north-eastern region of the country. Although the HBsAg prevalence rate in Muse Township was slightly higher than the HBsAg prevalence rates in previous studies it was much lower than the prevalence of HBsAg in residents of Namtee, a town in Kachin State which was 20.5% [5].

This intranational variation in the prevalence of HBV infection could be due to ethnic differences or local customs leading to iatrogenic transmission of HBV infection. Among a group of novices and monks of a monastery in a peri-urban area of Yangon, a high prevalence of HBsAg (17.5%) was detected and might be due to the common sharing of razor knives (*thin-done-dah*) used for shaving the head periodically [8].

One of the significant finding was the low HBsAg sero-positive rate in children under 12 years of age (2.4%). The HBsAg prevalence was lower than the previous reports on hepatitis B sero-positivity in children residing in the urban and peri-urban areas of Yangon. It had been reported that 8% of 189 children aged 3 months to 12 years from Mayangone Township were sero-positive to HBsAg [9].

In an earlier study by Khin Thant Zin in 1993, higher HBsAg sero-prevalence rates of up to 11% had been reported [10]. The difference might be due to temporal variation. Availability of hepatitis B vaccines could have reduced the prevalence

of HBsAg among the children. However, the proportion of children vaccinated with hepatitis B vaccine was not documented in the present study. It could be assumed that horizontal transmission predominate vertical transmission of HBV in the study population.

The findings from the present study showed that males had a slightly higher HBsAg carrier rate of 13.9% compared to 12.7% among the females. It was similar to the findings of a study by Khin Maung Tin where no significant difference in the prevalence for males (11.5%) and females (9.07%) was observed [3].

In a study by C-J Chen and co-workers, they had found that Taiwanese employees born in mainland China had rates of chronic HBV infection similar to those in the provinces of China from which they originated and was attributed to migrant difference [2]. Findings from this study had revealed that among the study groups, the Chinese subjects had the highest prevalence rate of 24.1% and reflect the HBsAg prevalence rate of 8- 20% in some parts of China [11].

Findings from this study had revealed that 23.9% of subjects with tattoos were positive for HBsAg which was significantly higher than the HBsAg sero-positivity rate in subjects without tattoos (23.9% *vs* 11.5%, p= 0.021). The common use of inadequately sterilized tattoo needles on different persons might be one of the iatrogenic causes of acquiring HBsAg sero-positivity.

There was no significant association of HBsAg sero-positivity with previous history of receiving blood transfusions (15.3% *vs* 12.9%) or surgical procedures (14.9% versus 12.5%). Screening of donor blood for hepatitis B surface antigen (HBsAg) at hospitals might have contributed to the prevention of accidental transmission of HBV to the recipients of blood transfusions. In this study, there was also no significant association of HBsAg sero-positivity with the presence of liver disease (14% versus 13%). Although the subjects gave history of liver disease, they did not have any information of being tested for hepatitis B markers and we were also unable to screen them for the presence of other HB markers at the survey.

In Muse Township, HBsAg sero-prevalence was higher in persons above of the age of 12 years which indicate a predominant horizontal transmission during childhood instead of the vertical transmission from infected mothers. Tattooing was the most significant factor associated with HBsAg sero-positivity. In order to prevent the transmission of HBV, hepatitis B vaccination programme of newborns and persons at risk should be augmented by health education activities for the control of hepatitis B infection in the north-eastern border region.

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