

## Hepatitis B surface antigen sero-prevalence in two border towns near Thailand

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We investigated the prevalence and associated factors of hepatitis B surface antigen (HBsAg) sero-positivity in a population of 380 subjects (182 males and 198 females) residing in Kawthaung Township in the southern border region and in 503 subjects residing in Tachileik Township in the eastern Shan State. Both townships are situated in the Myanmar-Thai border. Sera samples were tested for the presence of hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg). HBsAg sero-positivity was detected in 7.1% (27 of 380) of subjects from Kawthaung and in 3.8% (19 of 503) subjects from Tachileik Township. In both study sites, the HBsAg sero-prevalence rate was higher among males. In Kawthaung Township, the HBsAg sero-prevalence was (8.8%) in males and 5.6% among females. Of them, 5 (18.5%) were HBeAg positive. HBsAg sero-prevalence was highest (9.5%) in the 41-60 years age group followed by 21-40 years age group. In Tachileik Township, males had a higher sero-prevalence rate (5.1%) than the females (3.2%) and the HBsAg sero-prevalence was highest (5.2%) in the 41-60 years age group followed by the 21-40 years age group. The HBeAg prevalence rate was 15.8%.

### INTRODUCTION

Hepatitis B is found throughout the world, but its prevalence varies greatly and is high in Asia, sub-Saharan Africa, the South Pacific, as well as within specific populations in South America, the Mid-East and the Arctic [1]. Worldwide, there are more than two billion people infected with HBV, out of which 350 million individuals are chronically infected with hepatitis B virus [2].

High prevalence areas include China, South-east Asia, and sub-Saharan Africa where the HBsAg carrier rate ranges from 10-20%. The prevalence rate is 3-5% in Japan, central Asia, the Middle East, Mediterranean area and Latin America and 0.1-2% in low prevalence areas such as the United States, Canada and Western Europe [3].

HBV infection is endemic in Myanmar, and studies carried out among different population groups revealed HBsAg carrier rate of 10-12% [4]. Previous community-based studies had shown that differential HBsAg prevalence rates existed in the north-eastern and north-western border regions of the country. The HBsAg prevalence is 13.2% in Muse Township situated on the Myanmar-China border in the north-east border [5] and 4.9% in Tamu Township which is situated on the Myanmar-India border in the north-west of the country [6].

HBV infections are diagnosed through the use of serological markers. The presence of HBV surface antigen (HBsAg) is the most common marker for HBV infection. Chronic hepatitis B is marked by the persistence of HBsAg in the serum of a patient for at least 6

months. Hepatitis B e antigen (HBeAg) is a marker of active viral replication [7].

In this study, the HBsAg sero-positivity and its associated factors were studied among the study populations in Kawthaung and Tachileik Townships situated in the Myanmar-Thai border region. Hepatitis B infection is endemic in Thailand, with 5 million Thais who are chronic carriers [8]. Apart from being located in the Myanmar-Thai border areas, the two townships had highly diversified ethnic populations and local customs.

## MATERIALS AND METHODS

Community-based cross-sectional studies were carried out on 380 subjects residing in Kawthaung Township situated in the southern border region and on 503 subjects residing in Tachileik Township in the Golden Triangle in the eastern border region of Myanmar. Both study places are situated on the Myanmar-Thai border. The study population included males and females within the age range of 9 months-82 years.

### *Study population*

#### (i) Kawthaung Township

The study population in Kawthaung Township was mainly made up of Bamar and Mon nationals and a combined group of other ethnic minorities. The study population included 182 males and 198 females within the age range of 7-75 years. The mean age of the males ( $35.9 \pm 11.7$  years) was older than the mean age of females ( $31.9 \pm 11.6$  years).

#### (ii) Tachileik Township

The study population was made up of Bamar, Shan, Ahkar, Larhu, Kachin and other minority groups residing in the area. The study population included 158 males and 345 females within the age ranged from 9 months to 82 years. The mean age of the males ( $27.7 \pm 19.5$  years) was significantly younger than that of females ( $35.6 \pm 19.6$  years).

### *Ethical clearance*

After obtaining informed consent from each subject and from parents and guardians of children participating in the studies, a pre-tested questionnaire was used to collect social and biological data from each subject. Clinical and family histories were carefully asked and recorded.

### *Sample collection*

Two milliliters of venous blood were collected from each subject under aseptic measures. Serum was separated by centrifugation at 3000 rpm for 10 minutes and stored at  $-20^{\circ}\text{C}$  and transported back to the Department of Medical Research (Lower Myanmar) on ice packs.

### *Laboratory tests*

- (i) Sera samples from Kawthaung Township were tested for HBsAg by using the SD HBsAg one-step, rapid, immunochromatographic test from the Standard Diagnostics, Inc., Korea. Samples that were positive for HBsAg were further tested for the presence of HBeAg using the SD HBeAg immunochromatographic test from the Standard Diagnostics, Inc., Korea.
- (ii) Sera samples from Tachileik Township were tested for the presence of HBsAg by using the In-house DMR HBsAg ELISA test kit according to the Instruction Manual [9]. Sera samples that were positive for HBsAg were further tested for the presence of HBeAg using the SD HBeAg immunochromatographic test from the Standard Diagnostics, Inc., Korea.

## RESULTS

The overall HBsAg prevalence in subjects from Kawthaung was 7.1% (27 of 380) with 8.8% among the males and 5.6% among the females. HBeAg was present in 18.5% (5 of 27) of the HBsAg-positive subjects. In Tachileik Township, the overall HBsAg prevalence was 3.8% with 5.1% among

males and 3.2% in females. HBeAg was detected in 15.8% (3 of 19) of HBsAg-positive subjects. In both study sites, while HBsAg prevalence was higher among the males, HBeAg prevalence was higher among the females (Table 1).

Table 1. HBsAg and HBeAg prevalence in different genders

	No. HBsAg positive	%	HBeAg positive	%
<i>Kawthaung Township</i>				
Males	182	16	8.8	2
Females	198	11	5.6	3
Total	380	27	7.1	5
<i>Tachileik Township</i>				
Males	158	8	5.1	1
Females	345	11	3.2	2
Total	503	19	3.8	3

The HBsAg prevalence was 7.5% among the Bamars which made up more than eighty percent of the study population in Kawthaung Township, followed by 5.9% among the Mons and 4.5% among the other ethnic groups. HBsAg sero-prevalence was highest (9.5%) in the 41-60 years age group followed by the 21-40 years age group. In Tachileik Township, the highest HBsAg sero-positivity rate of 6.7% was seen in the Shan nationals which constituted more than twenty percent of the study population, followed by 2.6% among the Kachins, 2.1% among the Bamar and 1.7% among the Ahkars. HBsAg sero-prevalence was highest (5.2%) in the 41-60 years age group, followed by the 21-40 years age group (Table 2).

#### Associated factors

In Kawthaung Township, a significant association of HBsAg sero-prevalence was seen in subjects with history of sharing of toothbrushes (26.3% versus 6.2%,  $P=0.001$ ). HBsAg positivity was higher in subjects with tattoos (8.1% versus 6.8%,  $P=0.660$ ), liver disease (8.3% versus 7%,  $P=0.763$ ), history of undergoing surgical procedures (8.7% versus 6.3%,  $P=0.403$ ) although they were not statistically significant. HBsAg sero-prevalence had no association with ear

piercing and history of receiving blood transfusion.

Table 2. HBsAg prevalence among different age groups in Kawthaung and Tachileik Townships

Age group	No. of subjects	HBsAg positive	%
<i>Kawthaung Township</i>			
0-20 years	47	1	2.1
21-40 years	227	17	7.5
<b>41-60 years</b>	<b>95</b>	<b>9</b>	<b>9.5</b>
> 60 years	11	0	0
All age groups	380	27	7.1
<i>Tachileik Township</i>			
0-20 years	149	4	2.7
21-40 years	173	7	4.0
<b>41-60 years</b>	<b>135</b>	<b>7</b>	<b>5.2</b>
>60 years	46	1	2.2
All age groups	503	19	3.8

In Tachileik Township, HBsAg sero-prevalence was higher in subjects who had history of drug abuse (12.5% versus 3.3%,  $P= >0.05$ ), presence of tattoos (5.1% versus 3.5%,  $P=0.496$ ), sharing of toothbrushes (5.2% versus 3.7%,  $P=0.574$ ) although the difference was not statistically significant. There was also no significant association of HBsAg sero-positivity with blood transfusion, ear piercing or body piercing, or history of hospitalization.

## DISCUSSION

In Myanmar, few data existed on the HBsAg sero-prevalence in the border areas with the neighboring countries. In this study, the HBsAg prevalence and the associated factors were studied in two townships situated in the Myanmar-Thai border. Kawthaung Township is located in the southern border region and Tachileik Township is situated in the eastern border region neighboring Thailand. Except from being located on the Myanmar-Thai border, the study population was greatly diversified in the two study areas with different local customs. In Kawthaung Township, the majority of the study population consisted of Bamars while the majority of the study

population in Tachileik Township was made up of Shans and Ahkars.

The HBsAg prevalence in subjects from Kawthaung was 7.1% (27 of 380) and was higher than that of the subjects in Tachileik Township which was 3.8% (19 of 503). The HBsAg sero-prevalence rates from this study were lower than the HBsAg carrier rate of 10-12% detected in different population groups in previous studies [4].

The HBsAg sero-prevalence was higher among the males in both study places. The HBsAg prevalence was 8.8% among the males and 5.6% among the females residing in Kawthaung Township and 5.1% among the males and 3.2% in females in Tachileik Township. It was similar to the findings of a community-based study by Khin Maung Tin and co-authors where no significant difference in the prevalence for males (11.5%) and females (9.07%) was observed [10]. Lewis-Ximenex and co-workers stated that male gender also seemed to play an important role in the acquisition of HBV infection and there were approximately twice as many males as females with acute HBV infection. The gender difference in the acute cases might also reflect the increased frequency of high-risk behavior such as multiple sexual partners and drug use among men compared to women [11].

HBeAg was detected in 18.5% (5 of 27) of the HBsAg-positive subjects in Kawthaung Township and in 15.8% (3 of 19) of HBsAg-positive subjects from Tachileik Township. The HBeAg prevalence rates were comparable to the findings of Nguyen VTT and co-authors in which HBeAg was detected in 16.4% of the HBsAg-positive group in a cross-sectional sero-prevalence study carried out in Vietnam [12]. In both study sites, the HBeAg prevalence was higher among the females.

In the United States, the highest rate of hepatitis B occurs in people 20-49 years olds [13], and the findings from this study had elicited that the age-specific HBsAg sero-prevalence rate was highest in the

41-60 years age group followed by the 21-40 years age group in both study places.

In both study sites, the HBsAg sero-prevalence was lower (2.1% in Kawthaung and 2.7% in Tachileik Township) in subjects less than 20 years of age. In Tachileik Township, the highest HBsAg sero-positivity rate of 6.7% was seen in the Shan nationals, which constituted more than twenty percent of the study population. It could be associated with the local custom of applying tattoos on wrists and nape of the neck believed to ward off evil by the Shan nationals. In Kawthaung Township, the HBsAg sero-prevalence was highest (7.5%) among the Bamars.

In Kawthaung Township, a significant association of HBsAg sero-prevalence was seen in subjects with history of sharing toothbrushes (26.3% versus 6.2%,  $P=0.001$ ) which highlighted the risk associated with the sharing of personal items. HBsAg sero-prevalence was also higher in subjects with tattoos (8.1% versus 6.8%), liver disease (8.3% versus 7.0%), surgical procedures (8.7% versus 6.3%) although they were not statistically significant. HBsAg prevalence had no association with ear piercing and history of receiving blood transfusion.

In Tachileik Township, HBsAg sero-prevalence was higher in subjects who had history of drug abuse (12.5% versus 3.3%), presence of tattoos (5.1% versus 3.5%), sharing of toothbrushes (5.2% versus 3.7%) although the difference was not statistically significant. There was also no significant association of HBsAg sero-positivity with blood transfusion, ear piercing or body piercing or history of hospitalization.

Findings from different studies elicited that HBsAg prevalence rates in the normal population may differ considerably within a country, depending on various local and ethnic, socio-economic, cultural, geographic, religious and other factors [14].

From this study, it is evident that the differential sero-prevalence of HBsAg and associated risk factors exist in the different

study populations residing in Myanmar-Thai border areas in the southern and eastern border regions of the country and reflects the HBsAg prevalence of 5-10% in neighboring Thailand [8].

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