

Prevalence study for hepatitis B in various groups of employees, Bangkok.

Chaivej Nuchprayoon*

Rachanee Ocharoen* Rujira Akkawat*

Tharintorn Apiratyodtin* Termsri Chumnijarakij**

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The frequency of hepatitis B antigen and antibody among employees in Bangkok was studied between January and December 1988. Age-adjusted prevalence rate of hepatitis B antigen (HBsAg) in 6012 persons was 9.7% in male and 5.5% in female with the median age of 36 years and 34 years respectively. Prevalence of antibody to HBsAg (anti-HBs) was much higher in all age groups in both sexes and increased with age, with the rate of 43.9% found in male and 30.3% in female (age-adjusted prevalence rate). The frequency of HBsAg as well as anti-HBs was higher in males than in females in all age groups. While the prevalence of anti-HBs negative among healthy non-carriers was higher in females than in males in all age groups (56.3% and 37.7% respectively). The prevalence in those previously exposed to HBV, as indicated by positive anti-HBc, was higher in males than in females (12.7% and 7.8% respectively). All the prevalence rates shown in this study for male and female differed with statistical significance at $\alpha = 0.05$. The frequency of HBsAg was found to be surprisingly high in the Leprosy Hospital personnel of 14.1% (n = 177), with 42.3% found in central supply workers, 30.8% in nurses, 11.5% in physicians, 7.7% in dentists, 3.8% in dietitians, cooks and surgical workers.

Reprint request : Nuchprayoon C, National Blood Centre, Henri dunant Road, Bangkok 10330, Thailand.

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* National Blood Centre, Bangkok, Thailand.

** Department of Preventive & Social Medicine Faculty of Medicine, Chulalongkorn University.

ชัยเวช นุชประยูร, รัชณี โอเจริญ, รุจิรา อัครวัฒน์, ชรินทร์ อภิรักษ์โยธิน, เต็มศรี ชำนิจารกิจ. การสำรวจความชุกของไวรัสตับอักเสบบีในกลุ่มอาชีพต่าง ๆ: กรุงเทพมหานคร. จุฬาลงกรณ์เวชสาร 2533 เมษายน; 34(4): 277-284

จากผลการตรวจเลือดเพื่อหาความชุกของไวรัสตับอักเสบบี ในเจ้าหน้าที่และพนักงานของหน่วยงานต่าง ๆ ทั้งของรัฐบาลและเอกชนในเขตกรุงเทพมหานคร จำนวน 6012 ราย ปรากฏว่าพบความชุกของไวรัสตับอักเสบบี (HBsAg) ในอัตราร้อยละ 9.7 ในเพศชาย และร้อยละ 5.5 ในเพศหญิง และพบว่าอยู่ในเกณฑ์อายุเฉลี่ย (มัธยฐาน) 36 ปี ในเพศชาย และ 34 ปี ในเพศหญิง สำหรับภูมิคุ้มกันต่อไวรัสตับอักเสบบี (Anti-HBs) พบในเพศชายสูงกว่าเพศหญิงคือร้อยละ 43.9 และ 30.3 ตามลำดับ อัตราการพบภูมิคุ้มกันพบว่าเพิ่มสูงขึ้นตามอายุ (จากอายุ < 20 จนถึง 59 ปี) ในทั้งสองเพศ จะเห็นได้ว่าในเพศชายจะพบทั้งอัตราความชุกของ HBsAg และ Anti-HBs สูงกว่าในเพศหญิง การไม่มีภูมิคุ้มกันต่อ HBsAg (all markers negative) พบในเพศหญิงในอัตราสูงกว่าเพศชาย (ร้อยละ 56.3 และ 37.7 ตามลำดับ) ส่วนอัตราพบภูมิคุ้มกันต่อ HBcAg ซึ่งแสดงถึงการเคยได้รับเชื้อไวรัสตับอักเสบบีมาก่อนนั้น พบในเพศชายสูงกว่าเพศหญิงในอัตราร้อยละ 12.7 และ 7.8 ตามลำดับ ค่าอัตราความชุก รวมทั้งหมดทุกค่าที่แสดงไว้เป็นค่าปรับมาตรฐานตามอายุทุกค่า และมีค่าแตกต่างระหว่างเพศชายและหญิงอย่างมีนัยสำคัญทางสถิติ สำหรับบุคลากรโรงพยาบาล (โรงพยาบาลโรคเรื้อน) จำนวนทั้งหมด 177 ราย พบเชื้อไวรัสตับอักเสบบีร้อยละ 14.1 ซึ่งสูงกว่าที่พบในหน่วยงานอื่น โดยพบในคนงานร้อยละ 42.3, พยาบาลร้อยละ 30.8, แพทย์ร้อยละ 11.5 และทันตแพทย์ร้อยละ 7.7 รวมทั้งโภชนากรและคนครัวร้อยละ 3.8 และ คนงานห้องผ่าตัด ร้อยละ 3.8

Hepatitis B Virus infection is one of the major public health problems in Thailand. Prevalence rate of HBsAg among Thai population, in general, is approximately 8-10%.⁽¹⁻⁵⁾ According to Beasley et al's study regarding the correlation of asymptomatic HBV infection of more than six months, 40-50% of HBV carriers die from cirrhosis of the liver and cancer of the liver; and their risk of developing cancer of the liver is 223 times⁽⁶⁾ higher than normal people. This alarming data stimulated both the government and private sectors to pay more attention to their employees' health, therefore rendered full cooperation in conducting this study.

The objectives of this study is to find the prevalence rate of HBV and anti-HBs among various groups of employees in Bangkok. The acquired data will serve to set up health education programme and clinical services concerning surveillance and long-termed study of HBV carriers.

Materials and Methods

The study group was 6012 non-probability sampling employees of the government, state enterprises, private companies, schools, hotels, banks and hospitals totalling 29 in numbers. The cross-sectional study was conducted between January-December 1988. Personal, occupational data (including age and sex) and blood samples were collected.

Laboratory Test

Blood sample was tested for Hepatitis B virus markers

HBsAg, Anti-HBs and Anti-HBc

All HBV markers were tested by Enzyme-linked Immunosorbent Assay (ELISA) method using Reagent of Abbott Laboratories as directed by the company. The value was read by light absorbent at the wave length of 492 nanometre (Quantumatic machine). The results of HBsAg, anti-HBs and Anti-HBc calculated by automatic machine were as follows:

HBsAg-positive meant specimen that had higher light absorbent value than cut off value calculated from positive and negative control.

Anti-HBs calculated anti-HBs value into mIU/ml unit. Positive result meant specimen that had anti-HBs value more than 10 mIU/ml.

Anti-HBc positive meant specimen that had lower light absorbent value than cut off value calculated from positive and negative control.

The qualitative data will be calculated by percent age or ratio, whereas quantitative data will be calculated by average rate, for instance, the median value. This included hypothesis testing regarding quantitative data by using Unpaired t-test. Age-adjusted prevalence rate was calculated by direct adjustment of rates.⁽⁷⁾

Study Results

Blood test result of 5835 persons from 28 institutions in Bangkok revealed that prevalence rate of HBsAg was 7.3% and anti-HBs was 37.5%. another institute selected for case study was the Leprosy Hospital at PraPradaeng where the prevalence rate found among personnel for HBsAg was 14.1% and anti-HBs was 28.2% (Table 1).

Table 1. Prevalence of HBsAg & Anti HBs among different work places : Bangkok 1988.

Work places	Sample size	Positive results (%)	
		HBsAg	Anti HBs
Government	154	10.4	34.4
State enterprise	2322	7.9	39.7
Private Company	1888	6.9	39.0
School	842	4.5	19.5
Hotel	458	9.8	55.0
Ban	171	9.4	35.1
Total	5835	7.3	37.5
Hospital	177	14.1	28.2

Details of blood test results in Leprosy Hospital personnel indicated that there were 26 persons afflicted with HBsAg. Out of these 26 persons, workers had the highest frequency of 42.3% followed by nurses at 30.8%. The test results among other groups were as

follows: 11.5% in physicians, 7.7% in dentists, 3.8% in dietitians, cooks and surgical workers. The median age of those found to have HBsAg was 32.3 years of age. (Table 2)

Table 2. Prevalence of HBsAg among hospital personnel.

Types of personnel	Total no. Personnel	No. tested	Positive result	
			no.	%
Nurses	110	81	8	30.8
Pathologists & x-ray technicians	8	5	0	0.0
Central supply workers	79	72	11	42.3
Physicians	14	7	3	11.5
Dentists & helpers	3	3	2	7.7
Dietitians & cooks	7	7	1	3.8
Surgical workers	5	2	1	3.8
Total	226	177	26	99.9
Median age of HBsAg positive = 31.3 years				

Table 3. showed age-adjusted prevalence rates of hepatitis B antigen in 6012 persons was 9.7% in male

and 5.5% in female with the median age of 36 years and 34.2 years respectively.

Table 3. Prevalence of hepatitis B antigen (HBsAg) by age & sex.

Age (years)	Number tested	Male		Female			Total		
		Number tested	Positive No. %	Number tested	Positive No. %	Number tested	Positive No. %		
< 20	176	11	6.3	633	15	2.4	809	26	3.2
20-29	556	57	10.3	560	34	6.1	1116	91	8.2
30-39	1471	145	9.9	1186	58	4.9	2657	203	7.6
40-49	672	76	11.3	427	33	7.7	1099	109	9.9
50-59	224	19	8.5	85	7	8.2	309	26	8.4
> 60	15	1	6.7	7	0	0	22	1	4.5
Total	3114	309	9.9*	2898	147	5.1*	6012	456	7.6
Median	35.6	36.0		32.2	34.2		34.1	32.2	

* Age-adjusted prevalence rates: male = 9.7%, female = 5.5% with statistically significant difference at $\alpha = 0.05$

Table 4. indicated that prevalence rates of anti-HBs in male was much higher than that in female (46% and 28.4% respectively) However, prevalence antibody to HBsAg was 43.9% in male and 30.3% in female (age-adjusted prevalence rates) with the median age of 36.8 years and 34.4 years respectively.

Table 4. Prevalence of Antibody to HBsAg (Anti-HBs) by age & sex.

Age (years)	Number tested	Male		Number tested	Female		Number tested	Total	
		No	Positive %		No.	Positive %		No.	Positive %
< 20	176	29	16.5	633	85	13.4	809	114	14.1
20-29	556	219	39.4	560	161	28.8	1116	380	34.1
30-39	1471	710	45.3	1186	375	31.6	2657	1085	40.8
40-49	672	367	54.6	427	168	39.3	1099	535	48.7
50-59	224	126	56.3	85	32	37.6	309	158	51.1
≥ 60	15	6	40.0	7	2	28.6	22	8	36.4
Total	3114	1457	46.8*	2898	823	28.4*	6012	2280	37.9
Median age	35.6	36.8		32.2	34.4		34.1	35.9	

* Age-adjusted prevalence rates: male = 43.9%, female = 30.3% with statistically significant difference at $\alpha = 0.05$

Table 5. showed that prevalence of anti-HBs negative among healthy non-carriers was higher in female than that in male in all age groups (56.3% and 37.7% respectively) (Age-adjusted prevalence rates).

Table 5. Prevalence of non-immuned to HBV (Negative to Anti-HBs) by age & sex.

Age (years)	Number tested	Male		Number tested	Female		Number tested	Total	
		No.	Negative %		No.	Negative %		No.	Negative %
< 20	176	133	75.6	633	500	78.9	809	633	78.2
20-29	556	231	41.5	560	330	58.9	1116	561	50.3
30-39	1471	390	26.5	1186	654	55.1	2657	1044	39.3
40-49	672	122	18.2	427	190	44.5	1099	312	28.4
50-59	224	34	15.2	85	35	41.2	309	69	22.3
≥ 60	15	5	33.3	7	3	42.9	22	8	36.4
Total	3114	915	29.4*	2898	1712	59.1*	6012	2627	43.7
Median age	35.6	32.4		32.2	30.4		34.1	30.1	

* Age-adjusted prevalence rates of non-immuned: male = 37.7%, female = 56.3% with statistically significant difference at $\alpha = 0.05$

Table 6. Positive to anti-HBc was higher in male than in female by age and sex (12.7% and 7.8% respectively) (Age-adjusted prevalence rates)

Table 6. Prevalence of Antibody to HBcAg (Anti-HBc) by age & sex.

Age (years)	Number tested	Male		Number tested	Female		Number tested	Total	
		No	%		No.	%		No.	%
< 20	176	3	1.7	633	33	5.2	809	36	4.4
20-29	556	49	8.8	560	35	6.3	1116	84	7.5
30-39	1471	226	15.4	1186	99	8.3	2657	325	12.2
40-49	672	107	15.9	427	36	8.4	1099	143	13.0
50-59	224	45	20.1	85	11	12.9	309	56	18.1
≥ 60	15	3	20.0	7	2	28.6	22	5	22.7
Total	3114	433	13.9*	2898	216	7.5*	6012	649	10.8
Median age	35.6	37.3		32.2	34.4		34.1	38.8	

* Age-adjusted prevalence rates: male = 12.7%, female = 7.8% with statistically significant difference at $\alpha = 0.05$

Discussion

The prevalence rate of HBsAg in various groups of employees in Bangkok was 7.6% which was quite close to the rate of 8-10%⁽¹⁻⁵⁾ among Thai population in general. The comparison between the report in Thailand and this study showed that there was an increase in the prevalence rate of HBsAg among certain groups of employees. According to Chantana Kun-aneek's 1983 report, the frequency of HBsAg among government officials was 5.4% and among companies employees was 4.4%.⁽⁸⁾ However, this study showed the increase of the frequency in the two groups of employees (10.4% among government officials and 6.9% among companies' employees). This showed that at present the HBV infectious rate is still high and there are also some differences in the two study groups. Nonetheless, the frequency rate among Thai population, in general, was 8-10%.

The study conducted in the Leprosy Hospital, Pra Pradaeng indicated that the frequency rate of HBsAg is 14.1%. This was higher than any reports regarding the prevalence rate among other hospitals personnel which was in the range of 2.3-7.6%.^(5,8-12) The highest prevalence rate was 42.3% in workers followed by

nurses at 30.8%. This could be explained by the fact that workers, nurses working in the Leprosy Hospital had higher HBsAg infection than physicians. On the other hand, the study of 178 cases in the Maharaj Hospital, Chiangmai, which differed from the above, reported that physicians were associated with the highest prevalence rate of HBsAg (34%) and nurses had the prevalence rate of 9.9%.⁽¹¹⁾

Thus, if there are any reports which shows high prevalence rate of HBsAg in leprosy patients, then it will substantiate the result of this study. The study data on prevalence rate of HBsAg in leprosy patients will render benefits to the control and prevention program for Leprosy Hospital personnel.

Prevalence study of HBsAg by age and sex revealed that age-adjusted prevalence rate of HBsAg in male was 9.7% and in female was 5.1%. According to Grossman et al's study in 1971, the prevalence rate of HBsAg in male was 9.8% and in female was 7.0%. Eventhough the two studies were performed 17 years apart, there was no significant difference between the prevalence rate of HBsAg in the residents of Huay Khwang District and that of the employees in Bangkok. The only difference was the median age which was higher in our study (36 years in male, 34 years in

female in this study, and 15.4% years in male, 20 years in female⁽¹⁾ in Grossman et al's). The reason was that this study collected the sample from people of various occupations whereas Grossman et al's sample consisted of people of all age groups residing in Huay Khwang District.

Eventhough the frequency of HBsAg in Western countries is less than that in Thailand, there are several reports about Hepatitis B infection among health care professionals. Dones AE et al took blood samples from 11208 physicians attending the American Medical Association meetings. The result was that the anti-HBs was 18.5%, and female had a slightly higher prevalence of anti-HBs than male. prevalence rate of anti-HBs was higher than in Orientals (43%). Orientals represented only 6% of the study population). Surgeons, pathologists and obstetrics were associated with the highest prevalence rates⁽¹²⁾ (28%, 27% and 21% respectively).

According to this study, prevalence rate of anti-HBs in male was 43.9% and in female was 30.3%. The prevalence in male which was higher than that in female was statistically significant ($P < 0.5$) Grossman et al's study showed that prevalence rate of anti-HBs in male was 52.3% and in female was 42.1% (Age-adjusted prevalence rates). The different results from these two studies indicated that each study chose diferent sampling population. According to Grossman et al⁽¹⁾ the prevalence of anti-HBs in male was higher than that in female. This showed that male had higher risk of contacting HBV than female.

Since the prevalence rate of HBsAg in Thai population is 8-10%, which is quite high, special attention should be directed to those who are negative to all markers. This group from various organizations will greatly benefit from the choice of efficient hepatitis B vaccine.

This study also indicated the age-adjusted prevalence rates of those who were negative to all markers

(37.7% in male and 56.3% in female). Thus, apart from laboratory tests for hepatitis markers, the budget for hepatitis B vaccination should be set up as part of health care benefits for the employees. This study also showed that the younger age group of both male and female had high negative anti-HBsAg and the antibody would increase with age.

Conclusions

The results of this study indicated that the age-adjusted prevalence rate of hepatitis B antigen (HBsAg) in 6012 of various groups of employees in Bangkok were 9.7% in male and 5.5% in female with the median age of 36 years and 34 years respectively. The prevalence of anti-HBs increased with age in both sexes with the rate of 43.9% being found in male and 30.3% in female. The prevalence of negative to all markers was higher in female than in male in all age groups and was 56.3% and 37.7% overall respectively. Those previously exposed to HBV that is with positive anti-HBc was 12.7% in male and 7.8% in female. The hospital personnel showed high prevalence of HBsAg of 14.1% with 42.3% found in central supply workers, 30.8% in nurses, 11.5% in physicians, 7.7% in dentists, 3.8% in dietitians and cooks and 3.8% in surgical workers.

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