PATTERN OF HBsAg POSITIVITY IN SELECTED GROUPS AT KING KHALID GENERAL HOSPITAL - HAIL REGION, KINGDOM OF SAUDI ARABIA

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Background: Hepatitis B virus (HBV) is endemic in the Kingdom of Saudi Arabia. The acquisition of infection occurs early in life. The availability of safe and efficacious vaccines has led to the feasibility of an effective control of HBV infection. This study compares the pattern of HBsAg positivity among selected groups of patients with similar groups in other regions in the Kingdom of Saudi Arabia.

Objectives: This study is conducted to determine the prevalence of HBsAg positive subjects among selected groups of patients attending the main general hospital in the Hail region.

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Subjects and Methods: This retrospective study included 14029 subjects that were tested for HBsAg at King Khalid General Hospital, during the period from April 1994 to April 1996.

Results and Discussion: The overall prevalence of HBsAg positive subjects was 3.5%. The prevalence for Saudis was about 3.2% for Saudis. Pakistanis had the highest prevalence of 11.8%. The prevalence was 3.02% for blood donors, and 2.1% among pregnant women. No significant difference was found among different age groups. Hail region had a lower prevalence of HBsAg positive cases compared to that estimated by previous studies in the Kingdom, suggesting success in efforts applied by the Ministry of Health (MOH) for prevention of Hepatitis B viral infection.

Conclusion: We can conclude that the prevalence of HBsAg positive subjects is declining in the Hail region, Kingdom of Saudi Arabia (KSA). This decline suggests the success of preventive efforts such as vaccination of newborns with the HBsAg vaccine. However, screening of pregnant women for HBsAg seems to be necessary.

Key Words: Hepatitis, prevalence, prevention, viral.

INTRODUCTION

Hepatitis B virus (HBV) infection is considered an important health problem in most countries. Thanks to the serologic and immunologic tests that were developed following the discovery of the Hepatitis B surface antigen (HBsAg) in 1964 by Blumberg et al., a significant amount of data has been accumulated in the world literature regarding the prevalence, carrier state, and mode of transmission of HBV.

In the Kingdom of Saudi Arabia (KSA), various studies of HBsAg prevalence have been conducted. These studies have described the prevalence of HBV, and modes of its transmission. Most of these data are related to the epidemiological aspects of this infection and have highlighted several interesting differences in HBsAg positive subjects among different population groups, e.g. blood donors, pregnant women, jaundiced patients, and those undergoing endoscopy. The overall prevalence of HBsAg in the KSA during the year 1988 was estimated to be 8.3%. However, since then there have been great efforts by the Ministry of Health (MOH) for prevention of Hepatitis B virus infections. These include vaccination of all newborns with the Hepatitis B vaccine, pre-employment screening of foreign employees, periodical screening of medical staff, and screening of pregnant women for HBsAg. This study was conducted to describe the pattern of HBsAg positivity among selected groups of patients attending the main general hospital in the Hail region.

MATERIAL AND METHODS

King Khalid General Hospital is the only governmental facility available in the Hail region which can perform serological testing for hepatitis markers. All cases in this region for which these tests are needed are referred to the laboratory at King Khalid General Hospital. The private sector does not play an important role in the Hail region and is restricted entirely to the main city, so patients attending this hospital can be considered to have been representative of all cases that required tests for hepatitis.
markers in the Hail region during the study period.

A retrospective study involved all cases that were tested for HBsAg at the Blood Bank and Laboratory of King Khalid Hospital, in the Hail region of the KSA during the period between April 1994 and April 1996. The study involved 14029 subjects. They included 6418 blood donors that were tested at the blood bank, and 7611 patients that were referred to the laboratory by different hospital departments. Available data included age, results of HBsAg test, and indication for testing for HBsAg. In addition to these variables, nationality and referral department were available only for patients tested by the laboratory and missed for blood donors.

Tests for the Hepatitis B surface antigen were performed using the enzyme immunoassay kits supplied by Abbott, North Chicago, Illinois (Auszyme). Sera were tested either on the day of collection or were stored at 0°C and thawed only once before testing. Repeated positive HBsAg results for the same patient were carefully checked and counted only once. Analysis of the collected data was done with the Statistical Package for the Social Science (SPSS) program.

RESULTS

A total of 2444 patients were tested for HBsAg during the period between 1 April 1994 and 1 April 1995. In addition, 3177 blood donors were tested for HBsAg during the same period. A total of 5167 patients were tested during the period between 1 April 1995 and 1 April 1996. Moreover, 3241 blood donors were tested for HBsAg during the same period.

Data about nationality were missed for all blood donors. Thus, the prevalence of HBsAg positive subjects among different nationalities was studied only among patients referred to the laboratory by different departments for HBsAg testing.

Table 1 compares the prevalence of HBsAg positive patients among different nationalities. Saudis had a total prevalence of about 3.2% during the year 1995-1996, which is less than that of the preceding year. Egyptians showed a similar decline in HBsAg positive cases, although the difference was not statistically significant (P>0.05). This was also true for non-Saudis other than Indians, Pakistanis, and Bangladeshis. Those nationalities did not show obvious decline in positive cases for HBsAg. Pakistanis and Filipinos had obviously higher prevalence of HBsAg positive cases than for other countries, namely 13.5% for Pakistanis and 9.6% for Filipinos during the year 1994-1995.

The prevalence of HBsAg positive cases did not differ significantly between different age groups (Table 2).

Table 3 shows the prevalence of HBsAg positive subjects according to the indications for their testing during the two years studied. This prevalence significantly declined during the year 1995-1996 among those routinely tested (blood donors, pregnant women, and those undergoing laparoscopic cholecystectomy). The prevalence of HBsAg positive subjects among jaundiced patients and those with liver problems during the year 1994-1995 was about 6.98%. It experienced insignificant decrease to 5.97% during the year 1995-1996. Prevalence of HBsAg positive cases among those undergoing dialysis was 2.29%, and it declined to 1.2% during the year 1995-1996. The total prevalence of HBsAg positive subjects declined significantly from 4.08% during the year 1994-1995 to 3.2% during the year 1995-1996.
### Table 1: Prevalence of HBsAg** cases among different nationalities

| Nationality   | April 1994 - April 1995 (X2=14.45 - P=0.02) | April 1995 - 1996 (X2=14.66 - P=0.02) | X² - P |
|---------------|-------------------------------------------|-------------------------------------|--------|
|               | Total Count | HBsAg +ve | Total Count | HBsAg +ve |          |
| Saudi         | 1520        | 67 (4.4%) | 3040        | 96 (3.2%) | 4.6 < 0.05 |
| Egyptian      | 169         | 5 (3.0%)  | 182         | 3 (1.6%)  | 0.6 > 0.05 |
| Indian        | 150         | 5 (3.3%)  | 335         | 12 (3.4%) | 0.0 > 0.05 |
| Bangladeshi   | 10          | 0 (0.0%)  | 154         | 8 (5.2%)  | 0.55 > 0.05 |
| Filipino      | 94          | 9 (9.6%)  | 213         | 8 (3.8%)  | 4.22 < 0.05 |
| Pakistani     | 37          | 5 (13.5%) | 34          | 4 (11.8%) | 0.1 > 0.05 |
| Others        | 464         | 26 (5.6%) | 1159        | 51 (4.4%) | 1.1 > 0.05 |
| **Total**     | 2444        | 117 (4.8%)| 5135        | 182 (3.5%)| 7.01 < 0.01|

Number of missing observations = 29

### Table 2: Prevalence of HBsAg** cases in different age groups

| Age groups | April 1994 - April 1995 (X2=4.11 - P=0.39) | April 1995 - April 1996 (X2=3.66 - P=0.45) | X² - P |
|------------|-------------------------------------------|-------------------------------------|--------|
|            | Total tested | HBsAg +ve | Total tested | HBsAg +ve |          |
| < 1 year   | 24            | 0 (0%)    | 29            | 1 (3.4%)  | 0.8 > 0.05 |
| 1 - 5      | 65            | 0 (0%)    | 74            | 3 (4.4%)  | 2.6 > 0.05 |
| 6 - 17     | 247           | 10 (4.0%) | 278           | 4 (1.9%)  | 3.4 > 0.05 |
| > 45       | 4417          | 178 (4.03%) | 6636         | 199 (2.99%) | 9.4 < 0.05 |
| **Total**  | 5374          | 216 (4.01%)| 7878         | 238 (3.02%)| 9.6 < 0.01|

Number of missing observations = 757

### Table 3: Prevalence of HBsAg** cases according to indication for their testing

| Indication for testing | April 1994 - April 1995 | April 1995 - April 1996 | X² - P |
|------------------------|-------------------------|-------------------------|--------|
|                        | Total count | HBsAg +ve | Total count | HBsAg +ve |          |
| Acute related illness  | 1159        | 81 (6.98%) | 1874        | 112 (5.97%) | 1.2 > 0.05 |
| Routine screening†     | 3639        | 128 (3.51%) | 5481        | 149 (2.71%) | 4.74 < 0.05 |
| High-risk screening (AKU) | 693       | 15 (2.2%)  | 966         | 12 (1.2%)  | 2.1 > 0.05 |
| **Total**              | 5491        | 224 (4.08%)| 8321        | 273 (3.3%) | 4.2 < 0.05 |

Number of missing observations = 215

### Table 4: Prevalence of HBsAg** cases among blood donors and in different departments

| Department        | April 1994 - April 1995 | April 1995 - April 1996 | X² - P |
|-------------------|-------------------------|-------------------------|--------|
|                   | Count | HBsAg +ve | Count | HBsAg +ve |          |
| Blood donors      | 3177  | 109 (3.4%) | 3241  | 98 (3.02%) | 0.8 > 0.05 |
| General Medicine  | 607   | 42 (6.9%)  | 792   | 69 (11.1%) | 1.5 > 0.05 |
| ANC               | 110   | 6 (5.5%)   | 1466  | 31 (2.1%)  | 4.9 < 0.05 |
| AKU               | 693   | 15 (2.2%)  | 966   | 12 (1.2%)  | 2.1 > 0.05 |
| Endoscopy         | 132   | 6 (4.5%)   | 151   | 3 (2.0%)   | 1.4 > 0.05 |
| OPD               | 363   | 28 (7.7%)  | 635   | 25 (3.9%)  | 6.5 < 0.01 |
| Pediatric         | 26    | 0 (0.0%)   | 37    | 2 (5.4%)   | 1.4 > 0.05 |
| Orthopedics       | 84    | 1 (1.2%)   | 48    | 1 (2.1%)   | 0.16 > 0.05 |
| Infectious control| 136   | 6 (4.4%)   | 575   | 16 (2.8%)  | 0.9 > 0.05 |
| Dermatology       | 5     | 0 (0.0%)   | 170   | 5 (2.9%)   | 0.15 > 0.05 |
| Others            | 158   | 11 (6.3%)  | 240   | 11 (4.5%)  | 1.03 > 0.05 |
| **Total**         | 5491  | 224 (4.08%)| 8321  | 273 (3.2%) | 6.1 < 0.01 |

Number of missing observations = 215

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Table 4 shows the prevalence of HBsAg positive subjects among blood donors, and different departments. The Department of General Medicine included those patients referred for HBsAg testing from all other hospitals and PHCCs in the Hail region. It showed the highest prevalence of HBsAg positive cases, 11.1% for the year April 1995 to April 1996. The prevalence of HBsAg positive subjects among blood donors was 3.02% during the year April 1995 to April 1996.

**DISCUSSION**

Hepatitis B virus (HBV) is endemic in the KSA where about 8% of apparently healthy adults are carriers of HBsAg.\(^7,15\) The acquisition of infection occurs early in life. By the age of ten years, 20% of Saudi children are positive for at least one of HBV markers.\(^20,21\) The availability of safe and efficacious vaccines has led to the feasibility of an effective control of HBV infection.\(^22-24\) A decline of 20% per year in the incidence of Hepatitis B viral infection was reported in the USA after adoption of national programs for vaccination of newborns and screening of pregnant women for HBsAg.\(^17\)

Vaccination of all newborns with Hepatitis B surface antigen vaccine started in the KSA on October 1989.\(^25\) High vaccination coverage of newborns with this vaccine exceeded 94% for those receiving the 3 doses of the vaccine in the Hail region during the year 1995.\(^18\) Moreover screening of blood donors, medical staff, and pre-employment screening of all foreigners for HBsAg is routinely conducted all over the KSA. Screening pregnant women for HBsAg is recommended by the MOH and is carried out to a varying degree in different regions in the KSA including the Hail region. In our study only 1466 pregnant women, representing about 8% of the total pregnant women registered at PHCCs, were screened for HBsAg in the Hail region during the year 1995-1996.\(^18\)

The total prevalence for HBsAg carrier state was found to be 3.3% during the period between April 1995 to April 1996. This level is less than that during the period between April 1994 and April 1995 (4.08%). The reduction was true mainly for Saudis. Moreover it is remarkably less than the total prevalence of 8.3% estimated for KSA during the year 1988.\(^16\) This reduction was also true for blood donors in Hail, 3.02% compared to 6.1% level estimated in Riyadh,\(^1,6,13,14,18\) and Medinah.\(^26\) Pregnant women showed slightly lower prevalence for HBsAg (2.1%), than that previously reported of about 3.1%.\(^12,27,28\) In addition prevalence of HBsAg among those undergoing laparoscopic cholecystectomy, 2.0%, showed a lower level than those reported before the year 1988, 5.4% for the same group of patients. The prevalence of HBsAg positive subjects among patients with jaundice and liver problems, 11%, was similar to that found in the Asir region, KSA.\(^18\) Although the prevalence of HBsAg positive subjects may differ in different regions in the country,\(^19,20\) the Hail region is not expected to have lower prevalence than other more socio-economically developed regions in the KSA, e.g., Riyadh. In addition, an obvious decline was noted in the total prevalence of HBsAg positive subjects during the year 1995-1996 compared to the preceding year. This decline was also noticed in adolescents and young adults (Table 2) and in different departments studied (Tables 3,4) (although statistical significance was inconsistent). Thus, we can safely suggest that the prevalence of the HBsAg carrier state is declining in the KSA. This decline is probably partly due to reduction of horizontal transmission through careful sterilization of surgical instruments and screening of blood donors, and partly due to decrease in vertical trans-
mission of Hepatitis B virus (from mothers to their newborns) through vaccination of newborns with HBsAg vaccine. Absence of a significant difference, however, between the prevalence of HBsAg positive cases among different age groups was found. The disease was found to affect infants and young children as well as adults.

Our findings direct attention that infection is acquired during infancy and that vertical transmission plays a role in transmission of Hepatitis B virus. Therefore, adoption of a national program for screening pregnant women for HBsAg appears to be of significant importance to prevent vertical transmission of Hepatitis B virus. Infants delivered to pregnant women that are positive to HBsAg should receive HBIG and the first dose of hepatitis vaccine within 12 hours of birth, and completion of the vaccine series within the first 6-8 months of age. Prevention of HBV infection in infancy prevents the spread of infection to older ages and reduces its prevalence.

The unexpected low prevalence of HBsAg positive cases among dialysis patients also reflects the careful screening of such patients and successful prevention of transmission of this infection in the Hail region. The Artificial Kidney Unit (AKU) at King Khalid Hospital is the only referral site for renal dialysis patients in the Hail region, so patients attending this center represent all cases of renal dialysis in the region and the prevalence of HBsAg among these patients reflects the prevalence of HBsAg in dialysis patients all over the region. A higher prevalence reported in different regions might be due to considering the repeated positive results for the same patients treated more than once.

CONCLUSION

We can conclude that the prevalence of HBsAg positive subjects is declining in the Hail region, KSA. This decline suggests the success of preventive efforts such as HBsAg vaccination of newborns and screening of blood donors and at risk groups for prevention of Hepatitis B viral infection. However screening of pregnant women for HBsAg also seems to be necessary.

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