

Hepatic viral infections in Yemen between 2000-2005

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ABSTRACT

الأهداف: الوصول إلى مستوى الانتشار لفيروسات الكبد المزمنة (HCV) و (HBsAg) من خلال الأبحاث الحديثة.

الطريقة: جمعت الأبحاث العلمية بطريقة المراجعة النظامية عن انتشار الفيروسات الكبدية المزمنة (HCV) و (HBsAg) في اليمن، سواء تلك التي نُشرت في المجلات المحكمة أو التي عُرضت في المؤتمرات الطبية الموثقة خلال الفترة من 2000م حتى 2005م. استخدمنا طريقة البحث عبر الكمبيوتر والأقراص والإنترنت إضافة إلى البحث في المجلات خارج الإنترنت.

النتائج: شملت الدراسة 6 محافظات في اليمن وأربعة مجموعات بحثية هي: المتطوعون الأصحاء، والمتبرعون بالدم، ومرضى الغسيل الكلوي، ومرضى الكبد المزمنين، بمعدلات انتشار مختلفة. كما وُجد أن نسبة معدل انتشار (HBsAg) للأربع مجموعات هي (8.02%) و (10.8%) و (12.3%) و (23%). أما مضادات فيروس (HCV) فكانت (1.74%) و (2.7%) و (33.8%) و (33.8%).

خاتمة: بلغت نسبة معدل انتشار الفيروس الوبائي في اليمن المستوى المتوسط. وهناك اختلاف واضح بين المجموعات المختلفة وأيضا اختلاف في المناطق الجغرافية مثل صنعاء وسقطرة، فوجدنا فيهما مستويات انتشار أكبر. وعليه فإن برامج مكافحة المرض والتحصين يجب أن تأخذ هذه الاختلافات في عين الاعتبار في خططها.

Objective: To determine the prevalence of hepatitis B surface antigen (HBsAg), and hepatitis C virus (HCV) antibodies in Sanaa, and other governorates of Yemen.

Methods: By systematic review with meta-analysis we collected the research performed in different governorates of Yemen during the period 2000-2005. This included the published papers (peer reviewed), and the papers presented at Yemeni conferences.

Results: We identified 4 groups with separate prevalences. We found HBsAg to be 8% in healthy volunteers, 10.8% in blood donors, 12.3% in patients

under dialysis, and 23% in patients with chronic liver diseases. Antibodies to HCV show different results, namely, 1.7% in healthy volunteers, 2.7% in blood donors, 33.8% in patients under dialysis, and 33.75% in patients with chronic liver diseases. The viral markers in different governorates showed significant differences in healthy and blood donor groups. The means of HBsAg and HCV antibodies in patients with liver diseases were recorded to be 26.2% for HBsAg, and 33.8% for HCV antibodies, with a total of 60%. The means in patients under dialysis, for HBsAg was 10.9%, and for HCV antibodies was 33.8%, with a total mean of 44.7%.

Conclusions: Hepatitis B and C appear to be a major health problem in our community. Our study results indicate an intermediate level risk of hepatitis B virus infection. There are some geographic areas in the country that may be at high risk. Control strategies should take these differences into account.

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Hepatitis B and C viruses (HBV and HCV) are one of the major health problems worldwide. Out of 2,000 million people who have been infected with the virus, more than 400 million are chronic carriers of the viruses.^{1,2} Viral hepatitis remains a major hazard for both hemodialysis patients, and staff.^{3,4} The availability of a serological test to detect hepatitis B now permits the evaluation of the ethological role of HBC in many governorates. Recent studies have reported a high prevalence of HCV. The possibility of patient to patient, or nosocomial transmission of viral hepatitis has become more evident in hemodialysis units. However, hepatitis B surface antigen (HBsAg) was found on the surfaces of gloved hands, needle clippers, furniture, and

external parts of dialyzers. The HBV survives drying for at least one week, and surface contamination can be the source of infection.⁵⁻⁷ Surveys in Africa and the Middle East showed that HBV was highly endemic with a prevalence rate of 20%. More seriously, that rate has increased from an average of 15% in 1989, to 23.3% in 1999.⁸ It is generally believed that HBV and HCV are highly prevalent in the Republic of Yemen. In the Republic of Yemen, many old surveys were carried out that show high carriage rates (between 13-20%) of HBsAg. The overall prevalence of total markers of HBV was 45%. Hepatitis viral infection is a major health problem in Yemen. Depending on the old published studies by El-Guneid (1993)⁹ and Al-Hadad (1993),¹⁰ Yemen is considered as a high endemic area according to the World Health organization (WHO) classification. In this study, we tried to determine the prevalence of HBsAg and HCV antibodies in the most recent years from 2000-2005, and in other governorates in addition to the capital Sanaa. This led to establishing sites representing the different epidemiological strata in Yemen.

Methods. By systematic review of the cross section studies, we collected the research performed in different governorates of Yemen during the period 2000-2005. This included the published papers (peer reviewed), and the papers presented in the documented Yemeni conferences. A computer-based search was performed for online papers and others, collected by the effort of the Center of Research and Studies in the Ministry of Health and Population, Sanaa, Yemen. Inclusion criteria were any peer reviewed published, or conference presented paper that considered viral markers screening in any population, or governorate in Yemen. Exclusion criteria including any research before 2000 or after 2005 or non-peer reviewed. Meta-analysis of the means and separation of the groups were performed.

Statistical analysis was performed using analysis of variance. All analyses were tested as 2-sided, for individual groups unrelated one-way ANOVA and in-between groups Dunnett T3 Post Hoc test for the statistical significance within the groups, and a value of $p < 0.05$ was considered significant.

Results. Fourteen papers were found, 11 were peer reviewed published,¹¹⁻²¹ and 3 were presented in the documented scientific conferences.²²⁻²⁴ This covered 6 governorates in Yemen, Sanaa (8 papers), Aden (2), Hajah (1), Hadramout (1), Hodieda (1), and Soqatra island (1). Four groups were identified with separate prevalences. The prevalence of HBV is shown in Table 1. The prevalence of HBV in different governorates showed significant differences for healthy

volunteers, and blood donors as shown in Figure 1. For HCV antibodies, 8 papers were found, 7 were peer reviewed published,^{11,13,15-19} and one was presented in the documented scientific conferences.²⁵ Table 2 illustrates the prevalence of HCV antibodies in the 4 groups. The HCV antibodies in different governorates show significant differences in healthy and blood donor groups as shown in Figure 2. The means of HBsAg and HCV antibodies in patients with liver diseases is shown in Table 3. The means of HBsAg and HCV antibodies in patients under dialysis is shown in Table 4.

Discussion. This systematic review with meta-analysis study was limited by the fact that some local peer reviewed journals were not well archived, and therefore difficult to reach. Although the distribution of the published papers in different governorates was not homogenous, and may reflect hospital based studies, the available data can be used while awaiting for the population based studies, which are more appropriate for the true prevalence. Table 3 indicated the overall chronic hepatic viral infection in patients with liver diseases in

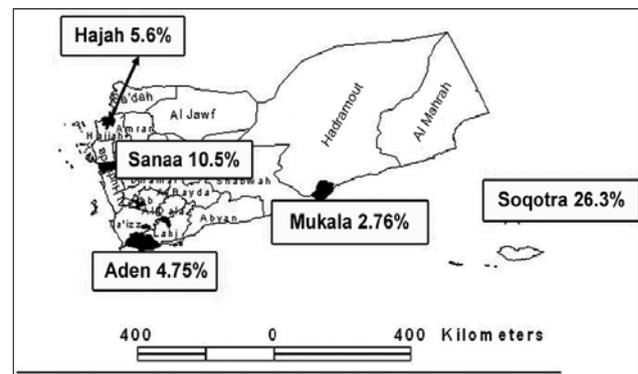


Figure 1 - Distributions of HBsAg in healthy and blood donors in different governorates.

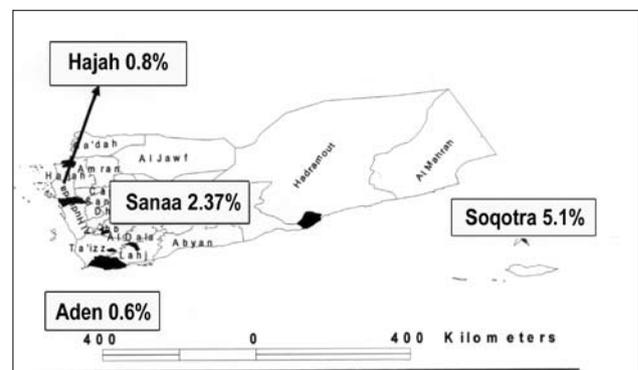


Figure 2 - Distributions of HCV antibodies in healthy and blood donors in different governorates.

Table 1 - Comparison of the study result for HBsAg in the groups with old Yemeni and international research.

| Groups | Yemen in 2005 (%) | Old Yemeni (%) | International studies (%) |
|-----------------|-------------------|-------------------------|-------------------------------------|
| Blood donors | 10.8 | 12.7-13.5 ²⁵ | |
| Healthy carries | 8.0 | 9 ²¹ | 0.5 ⁷ |
| Dialysis | 10.9 | | |
| Liver diseases | 26.2 | 24 ⁹ | 16 ¹⁵ , 18 ¹⁸ |

Table 2 - Comparison of the study result for HCV antibodies in the groups with old Yemeni and International research.

| Groups | Yemen in 2005 (%) | Old Yemeni (%) | International studies (%) |
|-----------------|-------------------|--|--|
| Blood donors | 1.74 | 2 ²⁶ 6 ²⁷ | <1.5 ³ 0.3-4 ¹⁹ |
| Healthy carries | 2.7 | | 5.7 ¹⁹ 19 ¹⁵ |
| Dialysis | 33.8 | | 26 ¹⁵ 40 ¹⁵ |
| Liver diseases | 33.8 | 21.5 ⁹ , 15.5 ²⁶ | 16 ¹⁵ , 18 ¹⁸ |

Table 3 - Hepatic viral infections in liver diseases in Yemen.

| Studies | HBsAg (%) | HCV-Abs (%) | Total hepatic virus (%) |
|---|-------------|-------------|-------------------------|
| Haidar ¹¹ in Hajah | 14.9 | 8.8 | 23.7 |
| Al-Mosliah and Al-Huraibi ¹⁵ in Sana'a | 33.6 | 37.1 | 70.7 |
| Al-Ezzy and Abdulhafeeze, ¹⁸ in Sana'a | 18.7 | 30.4 | 49.1 |
| Mean | 22.4 (26.2) | 25.4 (33.8) | 47.8 (60) |

Table 4 - Hepatic viral infection in dialysis patient's

| Studies | HBsAg (%) | HCV-Abs (%) | Total hepatic virus (%) |
|--|-----------|-------------|-------------------------|
| Bahaj ²² in Mukala | 12.0 | - | - |
| Rashed et al ²³ in Hodieda | 12.6 | 28.6 | 41.2 |
| Al-Ezzy and Abdulmuiz, ¹⁹ in Sana'a | 8.0 | 39.0 | 47.0 |
| Mean | 10.9 | 33.8 | 44.7 |

Yemen as 60%. The HCV represent higher prevalence than HBV, in more than one third of the patients. This is similar to the findings from Saudi Arabia (Table 2). In Table 3 the mean results of Haidar¹¹ from Hajah were clearly lower than the other prevalence, and on review of Haider's sample,¹¹ it was for patients suspected with liver diseases, and this may explain the lower prevalence. To avoid bias we included 2 total means, with and without Haider (in between brackets). Another explanation is the lower prevalence in Hajah governorate,¹¹ in comparison with Sanaa governorate (Almoslih¹⁵ and Al-Ezzy¹⁸), and this is consistent with the lower prevalence of the hepatic viral infection in the healthy and blood donor groups in Hajah governorate (Figures 1 & 2). Soqotra, an isolated big island in Yemen, represented the highest prevalence for both HBsAg (26.3% in Figure 1) and

HCV antibodies (5.1% in Figure 2). This may be due to a decreased health resource and education in that rural area. For HBsAg, Sanaa surveys represented higher prevalences in the healthy groups (10.95% versus 2.8% from Aden and 1.5% from Hajah), and in the blood donors group (10.1% versus 9.8% from Hajah, 6.7% from Aden, and 2.8% from Mukala). The Sanaa surveys also represented higher prevalences in the 2 groups, healthy and blood donors (10.5% versus 4.8% from Aden, 5.6% from Hajah, and 2.8% from Mukala) as shown in Figure 1. For HCV antibodies, Sanaa surveys also represented higher prevalences in the healthy groups and blood donors group (2.4% versus 0.8% from Hajah, and 0.6% from Aden), and Soqotra with much higher prevalences (5.1%). Taiz, Hadramout, and Hodieda are large governorates, however, data for the

prevalences were rare and inadequate. The vaccination for the HBV, and measures to diagnose and separate the patients with HCV are now available in most centers, blood banks, dialysis units, and in the population educational programs.

In conclusion, hepatitis B and C appear to be a major health problem in our community. Our study results, indicate an intermediate level risk of hepatitis B virus infection, however, some geographic areas (Sanaa and Soqatra) may be at high risk, and vaccination for the people at higher risk should be reevaluated. Significant difference in prevalence and epidemiology exists among different communities within the same country, and control strategies should take these differences into account. Strict measures regarding development of sensitive assay for HBV and HCV to the people at more risk should be implemented, as this disease is a preventable one. Other governorates (Taiz, Hodieda, and Hadramout) should be screened for all types of groups, and further studies are required to determine other possible causes, such as autoimmune hepatitis, metabolic diseases, and Khat or other local causative toxins to the liver.

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