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## Seroprevalence Of HBV,HCV and HIV Viruses among Blood Donors in Al- Mukalla – Hadhramout- Yemen

Ahmed Mubarak daakeek\*

### Abstract

This Retrospective study was done during the year 2009 to determine the seroprevalence of hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV), among blood donors in Al-Mukalla hospitals blood banks – Hadhramout-Yemen. Data was collected from blood banks, recorded and grouped according to their serology results. A total of 4526 blood donors were registered during the study period. 252 of them (5.3%) were hepatitis B surface antigen (HBsAg) positive, 29 (0.6%) were anti-hepatitis C virus (anti- HCV) positive and 4 (0.09%) were- anti- human immunodeficiency virus(Anti- HIV) positive. Their average age was between 18 -50 years, and all positive cases were males. The seroprevalence rate of positive hepatitis B surface antigen (HBsAg) among blood donors was intermediate in relations to other areas in our country but higher than worldwide except African countries. Anti-HCV among this sample was lower than other areas in our country and similar in being low if compared to international findings. Anti-HIV was low and similar to regional and Asian countries.

**Keywords:** HBV; HCV; HIV; Blood donors; Al-Mukalla; Yemen.

### Introduction:

The discovery of transfusion-transmissible infections (TTIs) has heralded a new era in blood transfusion practice worldwide with emphasis on two fundamental objectives, safety and protection of human life. Hepatitis C virus (HCV), human immunodeficiency virus(HIV) and hepatitis B virus (HBV) are the three most important agents responsible for transfusion transmitted infections (TTIs) [28]. The risk of transmitting hepatitis through transfusions of blood and blood products has been known since 1950 (28). In 1965, Blumberg reported the discovery of the hepatitis B surface antigen (HBsAg) [28]. Hepatitis B virus (HBV) is the most common cause of serious liver infection in the world and is said to have infected more than two billion people [26].

The World Health Organization (WHO) reported that approximately 350 million people are chronically infected with the hepatitis B virus and 170 million people carry the hepatitis C virus worldwide [20]. The hepatitis C virus was discovered in 1989 as the major causative agent of non A and non B hepatitis (3). The hepatitis C virus is transmitted via blood and blood products, both parenterally and through sexual contact [3]. The first case of transfusion-associated AIDS was described in an infant given transfusion for erythroblastosis foetalis [21]. Thereafter, many cases were reported all over the world in which transfusion of blood and its products was the only risk factor [33,41]. Acquired

immunodeficiency syndrome (AIDS) is the leading universal health problem of considerable socioeconomic impact. In 2005, the United Nations Program reported that 40.3 million people are living with AIDS, of which 7.4 million in East and Southeast Asia [42]. However, some countries reported low levels of HIV epidemic such as in Afghanistan, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen (44). However, limited biological supervision of HIV infection may not reflect the true prevalence among the populations in these countries [44].

With every unit of blood, there is 1% chance of transfusion-associated problems including transfusion-transmitted diseases [9]. Among all infections, HIV and hepatitis are the most dreadful (9). The improved screening and testing of blood donors has significantly reduced transfusion-transmitted diseases in most developed countries (9). Poor health education and lack of awareness result in the reservoir of infections in the population.

The present study has been conducted to screen the HIV, HBV and HCV in blood donors at the blood bank units of Ibn-Sina and Al- Mukalla hospitals in Al- Mukalla city- capital of Hadhramout governorate.

### Materials and methods:

This descriptive retrospective study was done among blood donors that attend blood banks in Ibn-Sina general hospital and Al-Mukalla hospital for childhood and maternity in Al-Mukalla city –Hadhramout at a period of January to December 2009. These hospitals are the two

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only governmental tertiary level teaching hospitals that provides health services to people in Mukalla city and all Hadhramout and nearby governorates.

Blood donors were either volunteers, or relatives or friends of recipient patients. All of them were Yemeni nationality. Data was collected from blood banks records, and donors were grouped according to serology results.

**Inclusion Criteria:** Apparently healthy donors of age 18 to 50 years with body weight above 45 kg would qualify for donation.

**Exclusion Criteria:** Individuals with anemia or past history of jaundice as well as those with a last blood donation not exceeding 4 months were excluded. Female donors don't accepted if pregnant or nursing or had a menstrual cycle.

In the blood banks, the first step in screening for potential blood donors was taking age and past medical history of the client. Individuals were

required to give answers to questions on previous illnesses and medical conditions, and past history of blood transfusion, but there is no written logbook. For that, there were no information about age, residency, occupation and blood grouping of donors.

ELISA tests were used for investigation of HbsAg, anti-HBc and anti-HIV antibodies.

Data were analyzed by Microsoft Office Excel 2010.

**Results:**

During the period of year 2009, 4526 individuals visited Ibn-Sina and Al-Mukalla hospitals for donation of blood. The age of donors range from 18 to 50 years old and almost all of them were volunteers, relatives or friends of recipient patients. The Majority of donors were males (4523, 99.93%) and only 3 donors (0.07%) were females (Table 1).

**Table (1) Distribution of blood donors according to sex**

Gender	Frequency	Percent
Male	4523	99.93
Female	3	0.07
Total	4526	100

After going through the process of screening, it was found that 252 (5.6%) were suffering from HBV infection and all of them were males. A

total of 29 (0.6%) donors were infected with HCV and 4 of them (0.09%) were positive for HIV all of them were males. (Table 2).

**Table(2): Prevalence of positive antibodies against HBV, HCV and HIV in all Blood donors study**

Results	HBV (n&%)	HCV(n&%)	HIV(n&%)
Positive	252(5.6)	29(0.6)	4 (0.09)
Negative	4274(94.4)	4497(99.4)	4522(99.91)
Total	4526(100)	4526(100)	4526(100)

The seroprevalence of HBV, HCV and HIV is purely among male blood donors included in this study, and no positive cases for HbsAg, anti-HBc and anti-HIV were detected in the 3 cases of female donors.

**Discussion:**

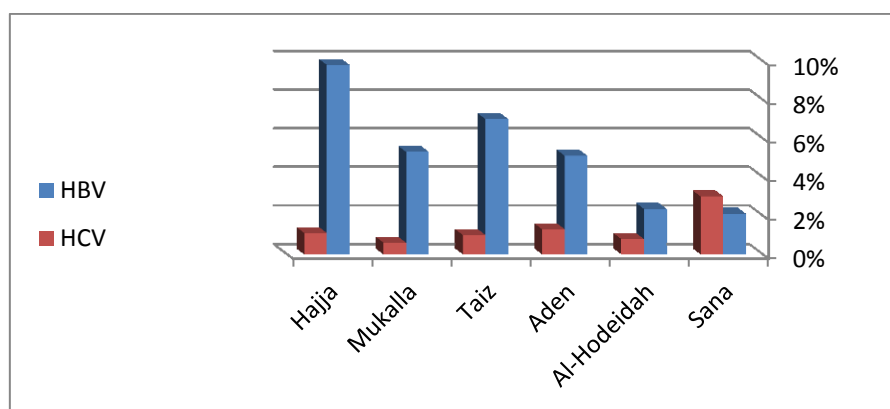
In this study an attempt had been made to define

the seroprevalence of Hepatitis B, C and HIV among healthy donor population mostly from Hadhramout and nearby governorates. Data consists of analysis of one year (January to December 2009).

In this study, 4526 individuals were investigated for HBV, HCV and HIV; Most of them were

males. This is due to low hemoglobin level in females in our community and the fact that women are less willing to donate blood due to cultural aspects in the community. The high ratio of male to female blood donors in Yemen was similar to other countries [8,16,23]. The 3 female donors in this study were donated blood due to a rare blood grouping (2 cases) or an emergency requirement of blood in absence of male donors (1 cases).

The study showed that the seroprevalence of HBV among blood donors in Al-Mukalla city hospitals was as high as 5.3%. This result had similar rate or less than other studies conducted in different cities in our country such as in Aden (5.1%) [7], Taiz (7%) [31], Hajja (9.8%) [19] (Fig. 1) and another study done by collecting data from different governorates (10.8%) [12], whereas lower rates were found in other studies done in Al-Hodeida (2.35%) [34] and Sana (1.72%, 2.1%) [4,39].



**Fig.1: Prevalence of HBV and HCV in different cities in our country.**

In the other hand, the seroprevalence of HBV was higher compared to many other countries. In regional and Arab countries, the rate in multiple studies done in different places in Saudi Arabia were (1.5%, 1.82% and 2.34%) [6,13,16,34], in Emirates was (0.23%) [5], Qatar (0.9%) [17], Iraq (4%) [8] and in Egypt (1.4%, 2.1%) [38,43]. In Asian countries HBV prevalence was also lower than our study as in Iran (0.56% - 3.74%) [10,22], India (1.7%, 2.23%) [11,32], but lower or similar to our study in Pakistan (2.28%,3.3%,5.96%) [23,24,25], and in Thailand (4.61%) [27].

In African countries seroprevalence was variable, higher as in Nigeria (7.50%) [37], and similar to this study as in Ethiopia (4.7%) [40]. In Turkey, the prevalence was lower than our study at some studies (1.38%,1.76%) [1,2] but higher in other study (4.19%) [18]. In other western and developed countries, the prevalence is much lower as in Germany (1.6%) [30], Canada (0.124%) [14], and America (0.0756 %) [15],Table (3).

The seroprevalence rates of hepatitis B were high in Al-Mukalla. It was intermediate to other cities in our countries and high in relation to other countries except African countries. Transmission

of hepatitis B through unscreened blood transfusion, and reuse of unsterilized syringes and medical equipment are well documented in the pertinent literature. Moreover, people having cupping, history of dental treatment, circumcision and shaving by barbers are also at increased risk due to reuse of equipment.

We found that 0.6% of the blood donors were positive for anti - HCV. This rate was the lower rate in the Republic of Yemen. A higher rate was seen in other studies among blood donors in our country which reported that Anti-HCV were about (0.79%) of the blood donors in Al-Hodeida [35], (1%) in Taiz [31], (1.1%) in Hajja [19], (1.3%) in Aden [7], (3%) in Sana [4] (Fig1), and (2.7%) in other meta-analysis study performed in different governorates in Yemen during the period 2000-2005 [12]. Comparing to regional and Arab countries; the rates were somewhat similar to different studies in Saudi Arabia (0.4% -0.59% ) [13,16,34], but lower rate in Emirates (0.11%) [5], and higher rates in Qatar (1.39%) [17], Iraq (1%) [8] and Egypt (3.5% -7.1% ) [38,43].

In Asian countries the seroprevalence was also variable comparing to our study from lower prevalence in Iran (0.12%) [10], similar to higher

prevalence in India (0.66%-1.0%) [11,32], low to higher prevalence in Pakistan (0.07% -4.0%) [23,24,25], to higher prevalence in Thailand (2.90%) [27]. In African countries e.g. Ethiopia and Nigeria, the prevalence was somewhat similar to slight higher than our study (0.7%)

(0.96%) [37,40]. In contrast, the prevalence in developed countries was lower than our study like Turkey (0.07%- 0.38%) [1,2,18], Germany (0.00002%) [30], Canada (0.1683%) [14], and America (0.299%) [15] Table (3).

**Table (3): Prevalence of HBV and HCV in different countries comparing to our study**

HCV prevalence %	HBV prevalence %	Country
0.60	5.30	Al-Mukalla-Yemen
0.4- 0.59	1.5-2.34	Saudi Arabia
0.11	0.23	Emirates
1.39	0.90	Qatar
1	4.00	Iraq
3.5-7.1	1.4-2.1	Egypt
0.12	0.56 - 3.74	Iran
0.66-1	1.7-2.23	India
0.07- 4	2.23-5.96	Pakistan
2.90	4.61	Thailand
0.70	7.50	Nigeria
0.96	4.70	Ethiopia
0.7-038	1.38- 4.19	Turkey

The seroprevalence of anti-HCV in Al-Mukalla was low in comparing with other cities in the Republic and most other countries despite the same transmission route as HBV which shows high prevalence and there is no clear explanation for that.

HIV infection rate among blood donors in this study was low (0.09%), in comparison with other studies in Al-Hodeida-Yemen (0.14) [35], Sana-Yemen (0.39%) [36], Makah in Saudi Arabia (0.12%) [34], India (0.3%, 0.56%) [11,32], Thailand (0.69%) [27], Ethiopia (3.8%) [40], Kenya (2-20%) [29] and Nigeria (0.96%) [37], but higher than that reported in Emirates (0.004%) [5], Iran (0.004%) [10], Pakistan (0.007%, 0.02%) [13,23], Turkey (0.008%) [1], Canada (0.00038%) [14], America (0.0097%) [15] and Germany (0.000018%) [30].

The seroprevalence of HIV among blood donors in Al-Mukalla is low and it is going with low prevalence in the region despite high contact of Yemeni people with people from African countries where HIV transmission risk is high.

There are however some shortcomings in our study, one of these is the absence of classifications of donors to age groups, and the

other is lack of blood grouping of donors, and this is due to the absence of related information from the blood banks.

#### **Conclusion:**

Among blood donors that were screened, the seroprevalence of hepatitis B was much higher in Al-Mukalla and in our country, where HCV has a similar - low prevalence comparing to most of countries worldwide. HIV has low prevalence of all blood borne viruses among blood donors. Given the lack of information on the prevalence of hepatitis B, C and HIV in the general population in Yemen, we recommend a population based study for the assessment of hepatitis B, C and HIV prevalence as a first step to implement control measures.

#### **Acknowledgment:**

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#### **Abbreviations:**

HBV: Hepatitis B virus, HCV: Hepatitis C virus, HIV: human immunodeficiency virus.

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## مدى الانتشار المصلي لعدوى التهاب الكبد "بي" و"سي" وفيروس نقص المناعة البشري بين المتبرعين بالدم في مدينه المكلا – اليمن

أحمد مبارك دعكيك

### الملخص

أجريت الدراسة خلال العام 2009 لبيان مدى فيروسات الكبد الوبائي "بي" و"سي" وفيروس نقص المناعة المكتسبة بين المتبرعين بالدم في مدينة المكلا- حضرموت. تم جمع المعلومات من سجلات بنوك الدم ، وتم تقسيم المتبرعين حسب نتائج فحوصاتهم المصلية، وشملت الدراسة 4526 متبرعاً بالدم الذين حضروا إلى بنوك الدم بمستشفيات مدينة المكلا. وكانت منهم 252 حالة (5.3%) إيجابية لفيروس الكبد "بي" و29 حالة (0.6%) لفيروس الكبد "سي" و4 حالات (0.09%) لفيروس نقص المناعة البشري. كان أعمار الحالات بين 18-50 سنة وكل الحالات الإيجابية كانت ذكوراً. كان معدل إيجابية فيروس الكبد "بي" في المتبرعين بالدم متوسطا مقارنة مع مناطق أخرى في اليمن ولكنها كانت عالية بالنسبة لدول المنطقة ودول العالم باستثناء الدول الأفريقية. أما فيروس الكبد "سي" فكان منخفضا بالمقابلة مع المناطق الأخرى في بلادنا و منخفض إلى مماثل لبقية البلدان. فيروس نقص المناعة المكتسب كان منخفضا أو مماثلا لبقية بلدان المنطقة والبلدان الآسيوية.

**الكلمات المفتاحية:** فيروس الكبد "بي"، فيروس الكبد "سي" ، فيروس نقص المناعة البشري، المتبرعون بالدم، المكلا.