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# Prevalence of Hepatitis B and C Viruses among Blood Donors at National Blood Bank Addis Ababa, Ethiopia

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## Abstract

**Background:** Despite the implementation of effective vaccination programs, hepatitis B and C remains an important cause of morbidity and mortality worldwide. Understanding the epidemiology of the diseases is essential in developing programs to prevent and treat this global infection.

**Objective:** To assess the prevalence of Hepatitis B and C virus among blood donors at National Blood Bank, Addis Ababa, Ethiopia 2015-2017

**Method and Materials:** An institution-based retrospective cross-sectional study was conducted on the prevalence of Hepatitis B and C among 909 blood donors at the National Blood Bank of Ethiopia in 2017 using a systematic randomized sampling technique. The data was analyzed using SPSS version 20 software and stated descriptively.

**Results:** The current study identified that the prevalence of hepatitis B and C were 24(2.6%) and 7 (0.8%) among volunteer blood donors respectively. The prevalence of hepatitis B is identified to be 9(2.7%) and 15(2.6%) among females and males correspondingly. Whereas, the commonness of the hepatitis is found to be 3.7% among under 40 years old volunteer blood donors.

**Conclusion:** Hepatitis B and C virus are public health important cases

**Recommendation:** Public health education on hepatitis infection, pre blood donation screening, and improve donors' knowledge about the diseases.

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**Keywords:** Hepatitis B; Hepatitis C; Prevalence

## Introduction

### Statements of the problem

Hepatitis B virus (HBV) infection is one of the most serious and prevalent diseases, affecting more than 2 billion people globally [1]. Hepatitis C is also a major global health problem affecting all countries, it is estimated that approximately 80 million people worldwide [2]. In Asian and Western Pacific countries where the hepatitis B virus (HBV) is endemic, the estimated prevalence of chronic HBV infection ranges from 2.4% to 16.0% [3]. The prevalence of hepatitis C virus (HCV) and HBV were 33 (8.5%) and 37 (9.5%), respectively. [4]. In Ethiopia, although nationwide survey report is lack, an estimated prevalence of HBV and HCV infection was 10%-15% and 2%-5 % respectively [5]. The prevalence of HBV seropositive among blood donors was 4.11-6.2% [5,6].

The prevalence of major bloodborne pathogens among blood donors in Ethiopia was 43.2%; of which

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25% and 13.3% were HBsAg and anti-HCV IgG [7]. Crude seroprevalence of major bloodborne pathogens was 17.6% among voluntary blood donors. About 12.5% of patients who received a blood transfusion are at risk of post-transfusion hepatitis [8]. This high prevalence of HBV and HCV has heightened the problems of blood safety in Ethiopia. Thus, continuous monitoring of the magnitude of transfusion transmissible blood born infections is important for estimating the risk of transfusion and optimizing donor recruitment strategies to minimize blood bourn infectious disease transmission. According to an annual record of 2008 in the national blood banks (NBB) of Ethiopia, across the country, 12670 units of blood were discarded. Of these, more than half (7,194 units) were due to infection. Among those 4573 units of blood were discarded due to infection with HBV and HCV. Generally, even though, there are several studies' reports on the prevalence of HBV and HCV infections among different risk groups, there is study limitation about viral hepatitis prevalence among blood donors especially in Addis Ababa. Thus, this study was designed to determine the prevalence of HBV and HCV infections among blood donors at Ethiopian National Blood Bank.

## Methods and Materials

### *Study Aim, Area, Period and Design*

The study was conducted to assess the prevalence of hepatitis B and C virus among 909 blood donors' charts at National Blood Bank, Addis Ababa, Ethiopia from 2015- 2017 using retrospective cross-sectional study design..

### *Sample size determination*

The sample size was determined based on the following assumptions; confidence level 95%, 2% margin error, the prevalence of HBV and HCV is 9.5 % and 8.5% respectively on a similar previous study among blood donors [8]. Based on the above data, the prevalence of HBV was used to get the maximum sample size; which was 909.

### *Sampling Procedures*

The national blood bank was selected purposively; Then, every 114th individual charts were selected using a systematic random sampling technique to obtain 909 study subjects among the total of 103,625 volunteer blood donors' registered charts at the central blood bank.

### *Data quality and analysis procedures*

The data was collected by trained data collector nurses using chart review/extraction questioners; Supervision was conducted by one supervisor and the principal investigator. Completed data extraction questionnaires form was reviewed randomly by the supervisor and the principal investigator to check for consistency and completeness. Data had been analyzed by using SPSS version 20.0. The results of the descriptive statistics were expressed as percentages and frequency.

### *Ethical consideration*

The proposal was reviewed by the AAU school of public health Research Ethical Committee and provided clearance. Based on the objective of the study an official letter was sent to the national blood bank. Then we obtain a permeation letter to conduct the data collection from the national blood bank officials.

## RESULT

### *Socio-demographic characteristics of study participant*

The proposal was r  
Of the total 909 study participants, 572 (62.9%) were males and 337 (37.1%) females. Mean age Standard Diversion for all the study population was 27 years  $\pm$ 8.4 SD (range = 18-61). The majority of study participants 441(48.5%) were between the age of 20-29 years. About 378 (41.6%) were with blood group O type and 282 (31%) were blood group A type; besides, about 578 (63.6%) of the participants were private employees (Table 1)

**Table 1:** Socio-demographic characteristics of study participant at NBB Addis Ababa Ethiopia in 2017

| Variable     |            | Frequency (N=909) | Percentage (%) |
|--------------|------------|-------------------|----------------|
| Gender       | Male       | 572               | 62.9           |
|              | Female     | 337               | 37.1           |
| Age in years | <20        | 184               | 20.2           |
|              | 20-29      | 441               | 48.5           |
|              | 30-39      | 179               | 19.7           |
|              | >=40       | 105               | 11.6           |
| Blood group  | A          | 282               | 31             |
|              | B          | 177               | 19.5           |
|              | AB         | 71                | 7.8            |
|              | O          | 378               | 41.6           |
| Occupation   | Unemployed | 2                 | 0.2            |
|              | Government | 46                | 5.1            |
|              | Private    | 578               | 63.6           |
|              | Student    | 283               | 31.1           |

**Prevalence of HBV and HCV among blood donors**

The prevalence rate of HBV infection was identified to be 2.6 % among males and 9 (2.7%) among females. The overall prevalence rate of HCV infection in the study was 0.8%; of which 4(0.7%) and 3(0.9%) of the infected individuals were male and female respectively. The highest prevalence of HBV and HCV was observed among blood donors whose age is between 30 and 39 years old followed by 20 to 29 years old donors. The prevalence of HCV was 3(4.2%) among blood donors whose blood group is AB. The prevalence of HBV infection was 12(3.4%) among blood group O but the prevalence of HCV was 2(1.1%) among blood group B subjects. (Table 2 and 3) HBV was more prevalent among government employees than private workers with a prevalence of 4.3% and 2.8% respectively, followed by students with a probability of 2.1%. However, the infection of HCV was commonly observed among students (1.1%). (Table 2)

**Table 2:** Serological test characteristics of study participant at NBB Addis Ababa Ethiopia in 2017

| Variable           | Status   | Number (%) |
|--------------------|----------|------------|
| HbsAg              | Positive | 24(2.6)    |
|                    | Negative | 885(97.4)  |
| Anti -HCV antibody | Positive | 7(0.8)     |
|                    | Negative | 902(99.2)  |

**Table 3:** HBV and HCV serostatus socio-demographic distribution among blood donors at NBB Addis Ababa Ethiopia in 2017

| VARIABLE |        | HBV seropositive |           | HCV seropositive |           |
|----------|--------|------------------|-----------|------------------|-----------|
|          |        | Yes (%)          | No (%)    | Yes (%)          | No (%)    |
| Gender   | Male   | 15(2.6)          | 557(97.4) | 4(0.7)           | 568(99.3) |
|          | Female | 9(2.7)           | 328(97.3) | 3(0.9)           | 334(99.1) |
| Positive | <20    | 6(3.3)           | 178(96.7) | 1(0.5)           | 183(95.5) |
|          | 20-29  | 8(1.8)           | 433(98.2) | 3(0.7)           | 438(99.3) |
|          | 30-39  | 9(5)             | 170(95)   | 3(1.7)           | 176(98.3) |
|          | >=40   | 1(0.9)           | 104(99.1) | 0                | 105(100)  |

|             |            |         |           |        |           |
|-------------|------------|---------|-----------|--------|-----------|
| Blood group | A          | 4(1.4)  | 278(98.6) | 0      | 282(100)  |
|             | B          | 5(2.8)  | 172(97.2) | 2(1.1) | 175(98.9) |
|             | AB         | 2(2.8)  | 69(97.2)  | 3(4.2) | 69(95.8)  |
|             | O          | 13(3.4) | 366(96.6) | 2(.5)  | 376(99.5) |
| Occupation  | Government | 2(4.3)  | 44(95.7)  | 0      | 46(100)   |
|             | Private    | 16(2.8) | 562(97.2) | 4(.7)  | 574(99.3) |
|             | Student    | 6(2.1)  | 277(97.9) | 3(1.1) | 282(98.9) |

## DISCUSSION

In the present study, 2.6% and 0.8% of subjects were positive for HBsAg and HCV antibodies respectively. Which is lower to [4.11% and 0.63%] in 2013[12] and 9.5% and 8.5% of HBV and HCV seropositivity were reported previously from Ethiopia according to WHO, 2016. There was 7.1% in 2000-2004 and 4.4% in 2010/2011 according to the median percentage of HBV markers in blood donation of 34 African countries [9]; this implies that there has been an appreciable change in the seroprevalence of HBV in the area over the last decade.

Furthermore when the finding of the current study were compared with results reported from similar study subjects of other countries, The prevalence of HBsAg in this study was lower than 11.4% reported from Vietnam [10], 4.2% in Sudan [11], 9.6% in Ghana [12], 18% in Nigeria[13], 7.9% in Albania [15], 6.2% in Pakistan [16], and Nevertheless, this finding is higher than the seroprevalence rate 0.6% reported in Namibia, Iraq and Morocco [14,17, 22], 0.32% in Italy[18], 0.51% in China[19], 0.2% in Serbia[20], 0.28% in California [21], 2.03% in Mediterranean countries and middle eastern countries [23] . The socio-cultural difference of blood donors in these studies and the fact that study participants included in previous studies were commercial blood donors might be one of the reasons for the prevalence variance. Regarding HCV infection, the overall prevalence of HCV antibody was 0.8 % in the present study, which was significantly lower as compared with reports from Nigeria, Pakistan, Burkina Faso, Morocco and China which was 6%, 0.96%, and 0.86% respectively [16, 22, 24]. But this result was higher as compared with findings in Vietnam, Iraq, Namibia, Korea, Serbia, and California which was 0.17%, 0.1%, 0.12%, and 0.52 respectively [10, 14, 20, 21]. Those variations could also be due to the actual change in population risk or the effectiveness of donor screening measures. The seropositive prevalence of anti-HCV antibodies was comparable with findings reported among blood donors from Senegal (0.8%)[25].

High prevalence of HBsAg and anti HCV antibody in the age group of fewer than 40 years of blood donors was seen which was similar to the findings of a study reported from Sudan [15], this might be due to high risk of exposure to HBV and HCV in a sexually active age group. Therefore, this finding suggests that susceptibility might be higher due to risk-behavior

## CONFLICT OF INTEREST

The author(s) declare that there are no conflicts of interest

## CONCLUSIONS

The seropositive prevalence of HBV and HCV were relatively low among blood donors in this study. Male and females blood donors are equally affected. Moreover, the seropositive prevalence of HBV and HCV were higher among young adult people.

## RECOMMENDATION

More efforts are needed to increase public awareness about HBV and HCV infection, and ways of preventing transmission. Blood donors screening for hepatitis B and C viruses before the blood donation .Public screening for hepatitis B and C viruses

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