



## Sero-prevalence of Anti- HCV among Yemenis Blood Donors Attending National Blood Transfusion and Research Centre in Sana'a: Yemen

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aim:** To determine the current sero-prevalence of HCV among blood donors in Sana'a city: Yemen.

**Study Design:** A descriptive cross sectional study.

**Place and Duration of Study:** This study was conducted on 3606 blood donors at the National Blood Transfusion and Research Centre in Sana'a, Yemen, during the period from October 2016 to January 2017.

**Methodology:** A descriptive cross-sectional study was conducted to estimate the prevalence of anti-HCV antibody using enzyme immunoassay (EIA) technique at the National Blood Transfusion and Research Centre in Sana'a Yemen during the period from October 2016 to January 2017.

**Results:** A total of 3606 blood donors were enrolled in this study, 1.6% of them were anti-HCV positive. Distributed as the following, 1.1%, 2.8%, 2.2%, 2.9%, 3.4%, 2.4% and 1.7% of anti-HCV antibody was among blood donors resident the capital city of Sana'a, Sana'a rural area, Taiz, Ibb, Dahmar, Amran and Almahwet governorate respectively. The prevalence rate of HCV was higher among Handicraft (1.8%). High HCV seropositivity were detected among the age group 36-45, the difference was found statistically insignificant.

**Conclusion:** Low percentage of HCV sero-prevalence was detected among our blood donors. Specific strategies for the screening of blood donors should be followed in the blood bank centers in Yemen.

*Keywords:* Yemen; HCV; blood donors; EIA.

## 1. INTRODUCTION

Hepatitis C virus (HCV) is a serious global public health problem is one of the most frequent infections associated with blood transfusion [1]. It has been reported that, HCV responsible for 90-95% of post transfusion, previously known as Non A Non B (NANB) transfusion-related hepatitis [2,3]. The estimated prevalence of HCV infection worldwide is 2.8% [4], whereas 3 to 4 million people are newly infected each year [2,3,5] and 2% of the world's population have chronic HCV infection [4].

High prevalence of HCV has been reported in the Middle East and North Africa region [6] where the largest population-level prevalence of HCV infection in the world is found in Egypt with 14.7% of the adult population had HCV [7,8] Region-specific estimates range from <1.0% in northern Europe [9] to >3.0% in North Africa [4,10]. It was estimated that, 227 306 (range: 167 623 – 249 707) people living with chronic hepatitis C infection in Australia in 2015 [11]. South-East Asia Region has about 30 million hepatitis C carriers, which is more than 1.6% of the total population [12].

The prevalence of HCV in Yemeni blood donors was slightly lower than 2.6% previously reported [13,14]. So, we aimed in this study to determine the sero-prevalence of HCV among Yemeni blood donors attending blood bank at the National Blood Transfusion and Research Centre in Sana'a. Detection of sero-prevalence of HCV is required by the decision maker to knowing the precise circumstances of the virus in our community.

## 2. MATERIALS AND METHODS

### 2.1 Study Design and Population

This Cross-sectional descriptive study was conducted among 3606 Yemeni blood donor who

attended the national blood bank service in Sana'a, Yemen from 1 October 2016 to 15 January 2017. Testing of blood donors specimens was performed at the laboratory virology unit.

### 2.2 Data Collection

The questionnaire was filled through face-to-face interviews with a trained public health specialist for those who could illiterate. The questionnaire gathered the socio-demographic and personal characteristics such as age, gender, residency, and occupation.

### 2.3 Methods

Eligible individuals under study were subjected to a general health checkup after examination of blood pressure, pulses, hemoglobin content, etc. Apparently, healthy persons of the accepted age (18 to 60 years) and body weight (>45 kg) would qualify for donations were enrolled in this study. All the blood donors, donating blood in the blood bank was considered as the study population. Five milliliters of blood was collected aseptically, allowed to clot and after centrifugation, all serum specimens were analyzed for Anti-HCV using an Enzyme Immunoassay technique according to manufacture instructions (Monolisa™ Anti-HCV plus, Version 3 no. 72340; BioRad Diagnostics, 92430 Marnes-la-Coquette, France). The result of the reaction of all tested specimens was read by Bio-Rad Micro plate reader machine.

Ethical approval was obtained from the National Blood Transfusion and Research Centre in Sana'a. The purpose and procedures of the study were explained to all individuals, and a written informed consent was obtained from all of them.

### 2.4 Statistical Analysis

The prevalence of anti-HBc was determined from the proportion of seropositive individuals in the

total donor population studied and was expressed as a percentage. Descriptive statistics of socio-demographic variable and other characteristics of sampled population were computed. A p value less than 0.05 was calculated to be statistically significant. The statistical difference was also evaluated by applying the Chi-square test. All the statistical analysis was done using the Statistical Package for Social Sciences (SPSS) software package version 20. (SPSS Inc. Chicago, Illinois, USA).

### 3. RESULTS

Out of 3606 blood donors registered in the study, 57 donors were found to be reactive for anti-HCV, giving an overall sero-positivity of 1.6% in our donor population and all of them were males from different region of Yemeni governorates. The number of males were 3578 (99.2%) and 28 (0.8%) were females with mean of age 29.95 years (range 45 years). Replacement donors were 2616 (72.6%) compared to 987 (27.4%) were voluntary donors, and the difference was found statistically insignificant.

The sero-prevalence of anti-HCV among blood donors resident in Sana'a capital city was 262319 (1.1%). However, the distribution of anti-HCV among donors, according to their residency was found to be higher among donor from Dahmar followed by Ibb and Sana'a rural area, Amran, Taiz and Almahwet governorates with percentages of 3.4%, 2.9%, 2.8%, 2.4%, 2.2% and 1.7% respectively and the difference was found statistically insignificant.

In other hand, the result of this study showed that, the occupational distribution of anti-HCV ranged from 1.4% to 1.8% and the difference was found statistically insignificant in all occupational categories.

This study revealed the difference in frequency of HCV among all age groups statistically insignificant, where the frequency of HCV was higher among 36-45 age group (2.2%), followed by (1.6%), and (1.4%) for 15-25, 25-35 age groups respectively and less (0.7%) among 46-55 years old.

### 4. DISCUSSION

The result of this study revealed that, 1.6% were positive for anti-HCV. Similar to this result have been reported by Wasfi et al. [15] who found that, 3.5% were positive for anti-HCV. The

recent result was higher than that reported by Ismail et al. [16]. High prevalence was reported by Awadalla [17], who, found that, 16.8% of blood donors had HCV. Al-knawy et al. [18] reported 1.43% of blood donors from the southern part of Saudi Arabia were seropositive for anti-HCV.

In addition, the result of this study showed that, 1.1% of blood donors resident the capital city Sana'a were positive for anti-HCV, which is in agreement with that reported by Sultan et al. [19] and Al-Waleedi [20] who, found that, 1.05% and 1.3% of blood donors were positive for anti-HCV in Sana'a city and Aden respectively. Approximately have equivalence 1.5% with that reported by Sonia et al. [21], Less prevalence of HCV as compared to the results of this study, was reported by Doro et al. [22] Ataallah et al. [23] and Sallam et al. [24], who found that, (0.7%), (0.3%), and (0.2%) of blood donors were positive for HCV in Tripoli, Baghdad and Sana'a respectively. High prevalence of HCV as compared to this study was reported by Alodini [25], who found 3.0% HCV of Hepatitis Infections among Blood Donors in Sana'a City, while Al-Robasi et al. [26].

In our study, we revealed that 4.8% of blood donors from Ibb governorate were positive for anti-HCV, compared to 1.99% reported by Gacche et al. [27] in Ibb city. This may be due to differences in the selection of subjects, where our blood donor population from different region of Ibb governorate.

The prevalence rate of HCV was higher among handicrafts, followed by military, students and professional workers with an account (1.8%), (1.6%), (1.5%) and (1.4%) respectively. Higher prevalence of HCV among these occupational categories was reported by Alodini [25], who found, (26.6%), (23.4%) and (22.3%) of HCV among military, handicrafts and student respectively and (3.2% - 8.5%) of professional workers were anti-HCV positive. In another study conducted by Al-Waleedi et al. [20] in Aden city showed that, (1.1%) of the military were found to be reactive for anti-HCV antibody, as compared to the result of the recent study.

HCV was higher among 36-45 age group (2.2%), followed by (1.6%), and (1.4%) for 15-25, 25-35 age groups respectively and less (0.7%) among 46-55 years old, which is similar to that reported by Al-Waleedi et al. [20], Less prevalence of anti-HCV antibodies among age groups was reported by Bala et al. [28] in Nigeria (0.3%-1.3%).

**Table 1. Distribution of HCV among blood donors in relation to gender, residency, occupational and age groups**

Donor category	Anti-HCV Ag test result				Total 3606		$\chi^2$	P
	Positive 57(1.6%)		Negative 3549 (98.4%)		N	%		
	N	%	N	%				
Voluntary	16	1.6	971	98.4	987	27.4	0.01	0.905
Replacement	41	1.6	2578	98.4	2619	72.6		
<b>Gender</b>								
Male	57	1.6	2521	98.4	3578	99.2	0.5	0.501
Female	0	0.0	28	100.0	28	0.8		
<b>Residency (governorate)</b>								
Sana'a capital city	26	1.1	2293	98.9	2319	64.3	15.4	0.165
Sana'a rural area	16	2.8	565	97.2	581	16.1		
Taiz	3	2.2	141	97.8	144	4.0		
Ibb	5	2.9	167	97.1	172	4.8		
Dahmar	4	3.4	115	96.6	119	3.3		
Amran	2	2.4	80	97.6	82	2.3		
Almahwet	1	1.7	57	98.3	58	1.6		
Alhudidah	0	0.0	43	1.2	43	1.2		
Albaidah	0	0.0	30	0.8	30	0.8		
Raymah	0	0.0	73	1.0	37	1.0		
Other	0	0.0	21	0.6	21	0.6		
<b>Occupation</b>								
Students	10	1.5	664	98.5	674	18.7	0.7	0.876
Professional	13	1.4	938	98.6	951	26.4		
Handicraft	24	1.8	1318	98.2	1342	37.2		
Military	10	1.6	629	98.4	639	17.7		
<b>Age groups</b>								
16-25	20	1.6	1217	98.4	1237	34.3	2.8	0.592
26-35	22	1.4	1579	98.6	1601	44.4		
36-45	14	2.2	617	97.8	631	17.5		
46-55	1	0.8	120	99.2	121	3.4		
> 55	0	0.0	16	100.0	16	0.4		

$\chi^2$ : Chi-square, p: Probability. %; Percentage

High prevalence was reported by Damulak et al. [29], who found (5.9%), (3.8%), (8.1%), (12.6%) and (10.9%) of HCV among the age groups of 18-25, 26-35, 36-45, 46-55 and more than 55 years old respectively. While, Noubiapa et al. [30] reported prevalence of anti-HVC antibodies among age groups was ranged from (2.9%) up to (6.9%).

## 5. CONCLUSION

According to our result, the prevalence of HCV among blood donors in Yemen is still low compared to many other countries. Moreover, donor education and specific strategies for the screening of blood donors should be followed in the blood bank centers in Yemen. Presented

data were documented during the civil war in Yemen, which may lead to disruption of health care services and increase blood donor's demands due to the current conflict, may have worsened the problem of HCV infection in our community.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee

has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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