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ORIGINAL ARTICLE

The Prevalence of Hepatitis D Virus in Reactive HBsAg Blood Donors at Department of Pathology, LUMHS Jamshoro

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ABSTRACT

Background: The hepatitis delta virus (HDV) is a defective hepatotropic virus that only affects patients infected with the hepatitis B virus (HBV). Infection with the hepatitis delta virus can cause acute hepatitis, including the fulminant presentation or spontaneously resolving infection and chronic infection

Aim: The present study's aim was to determine the prevalence of the Hepatitis D virus in reactive HBsAg blood donors at Diagnostic and Research Lab Hyderabad.

Materials and Methods: This cross-sectional study was conducted on 434 blood donors at the Pathology department (Diagnostic and Research Laboratory) Civil Hospital, Hyderabad from January 2017 to December 2017. All the healthy individuals who visited at Diagnostic and Research Laboratory of Civil Hospital, LUMHS Hyderabad as blood donors with specific age groups of either gender were included in this study. All the individuals underwent Hepatitis screening. All of those cases that were noted with positive HBV further underwent HDV screening test. All the data was recorded in the proforma for the purposed of analysis. SPSS version 20 was used for data analysis.

Results: Of the total 434 blood donors, 420 (96.8%) were male and 14 (3.2%) were female. The overall mean age was 31.65±4.67 years with an age range of 18 to 60 years. Out of 434, the incidence of positive delta virus was 62 (14.3%) while the remaining 372 (85.7%) were negative delta hepatitis blood donors. The prevalence of delta hepatitis blood donors with respect to age distribution were as follows; 18-30 years had 208 (48%), 31-40 years had 188 (27%), 41-50 years 69 (16%), and 51-60 years 39 (9%). Of the total 62 positive delta hepatitis, the prevalence of males and females was 98.4% and 1.6% respectively. All the donor's blood group was divided into +O, +B, +A, +AB, -O, -A, and –B with their respective prevalence was 48.6%, 22.6%. 11.5%, 8.8%, 2.5%, 3.5%, and 2.5% whereas their frequency in positive tested delta hepatitis was 36 (58.1%), 7 (11.3%), 10 (16.1%), 6 (9.7%), 1 (1.6%), 2 (3.2%), and 0 (0%) respectively.

Conclusion: It is concluded that the prevalence of HDV is 14.3% in Hepatitis B reactive healthy donors. This is a higher prevalence as compared to previously published studies. No such adequate recent data is available at the local level. More research is needed on this event, to provide adequate knowledge, which will be helpful to clinical and laboratory investigators, and physicians to reduce the burden of liver disease caused by HBV and HDV co-infection.

Keywords: Hepatitis delta virus; HBsAg reactivity; Blood donors;

INTRODUCTION

Blood or blood products can carry a variety of bacteria, parasites, and viruses. These blood transfusion-transmitted agents such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) are all prerequisites to be tested because of their association with chronic and potentially serious clinical sequelae worldwide [1]. Transfusion therapy had serious consequences in terms of infectious delta hepatitis virus (HDV), HCV, and HBV. Despite the use of effective molecular screening tools and serologic to perceive healthy blood donors transfusion-transmitted agents, the risk of transmission residues [2]. Infection with HDV causes hepatitis delta, which entails the transmission of HBV (HBsAg) antigen. The prevalence of HDV infection is extremely high in the South America, West Africa, Central Asia, and the Middle East, [3]. HDV infection was found to be extremely common among blood donors with infectious HBV [4]. Outdated approaches for detecting infectious HDV like serum antibodies (anti-HDV), are adequate for detection. Molecular technique's current advances, such as hybridization of (RT-PCR) and HDV-RNA have augmented accuracy of diagnostic and provided an additional comprehensive considerate of HDV infection regular progression [5].

The hepatitis delta virus (HDV) is a flawed hepatotropic virus that affects hepatitis B virus (HBV) infectious patients [6]. The hepatitis delta virus infection may leads to acute hepatitis, including chronic infection. In healthy chronic carriers of HBsAg, a chronic HDV replication occurs, and these individuals are at high risk of developing severe chronic liver disease [7]. Also, HDV is spread parenterally through infected body fluids or blood because it shares the same (HBV viral proteins) viral envelope. HBV/HDV co-infections, in particular, frequently cause more severe symptoms than HBV monoinfections. An acute co-infection appears after 3 to 7 weeks of incubation and can be asymptomatic, cause several nonspecific symptoms (such as fatigue, lethargy, anorexia, and nausea), or result in acute liver failure [8]. Hepatitis B virus (HBV) and hepatitis delta virus (HDV) infections are

potentially dangerous complications of transfusion therapy [9, 10]. No local adequate data found in the literature regarding this event in healthy blood donors. Therefore this has been planned to evaluate the burden of delta virus in HBV infected donors.

MATERIALS AND METHODS

This cross-sectional study was conducted on 434 blood donors at the Pathology department (Diagnostic and Research Laboratory) Civil Hospital, Hyderabad from January 2017 to December 2017. All the healthy individuals who visited at diagnostic and research laboratory of Civil Hospital Hyderabad as blood donors with specific age groups of either gender were included in this study. All the individuals underwent Hepatitis screening. All of those cases that were noted with positive HBV further underwent HDV screening test. All the data was recorded in the proforma for the purposed of analysis. All the blood donors with an age above 60 years positive HCV and negative HBsAg were excluded. A total of 434 blood donors serum samples were gathered and separated into a Vacutainer sterile without anticoagulant and centrifuged at 800–1600g for duration of 20 minutes. The parted serum was moved to tubes (polypropylene) and kept at 20 LC or lower until it was used. To determine repeated reactivity, primarily, re-testing of HBsAg-reactive samples were done using the same setting and approach. With >98% sensitivity and specificity, microplate analyzer was used for testing serum samples to determine the total anti-delta antibody.

SPSS version 20 was used for data analysis. Frequency and percentage were computed for qualitative variables. Mean and standard deviation was calculated for quantitative variables like age. Chi-square Test was applied to compare the prevalence of delta virus according to age groups, gender, and blood groups. A p-value <0.05 was considered significant.

RESULTS

Of the total 434 blood donors, 420 (96.8%) were male and 14 (3.2%) were female. The overall mean age was 31.65±4.67 years with an age range of 18 to 60 years. Out of 434, the incidence of positive delta virus was 62 (14.3%) while the remaining 372 (85.7%) were negative delta hepatitis blood donors. The prevalence of delta hepatitis blood donors with respect to age distribution were as follows; 18-30 years had 208 (48%), 31-40 years had 188 (27%), 41-50 years 69 (16%), and 51-60 years 39 (9%). Of the total 62 positive delta hepatitis, the prevalence of males and females was 98.4% and 1.6% respectively. All the donor's blood group was divided into +O, +B, +A, +AB, -O, -A, and –B with their respective prevalence was 48.6%, 22.6%. 11.5%, 8.8%, 2.5%, 3.5%, and 2.5% whereas their frequency in positive tested delta hepatitis was 36 (58.1%), 7 (11.3%), 10 (16.1%), 6 (9.7%), 1 (1.6%), 2 (3.2%), and 0 (0%) respectively. Blood donor's gender distribution is shown in Figure-1. Distribution of donors blood group (n=434) with respect to age group is demonstrated in Figure-2. Distribution of blood donors according to age group (n=434) is illustrated in Figure-3. The prevalence of delta virus is shown in Figure-4 (n=434). Table-1 shows the prevalence of delta virus (n=44) according to the age group. Prevalence of delta virus according to gender distribution is shown in Table-2 (n=434). Table-3 illustrate the prevalence of delta virus (n=434+ according to the blood group.

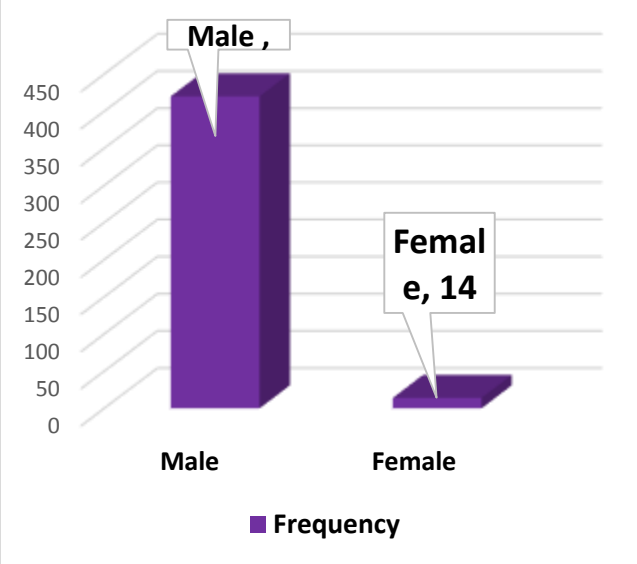

Figure-1 gender distribution (n=434)

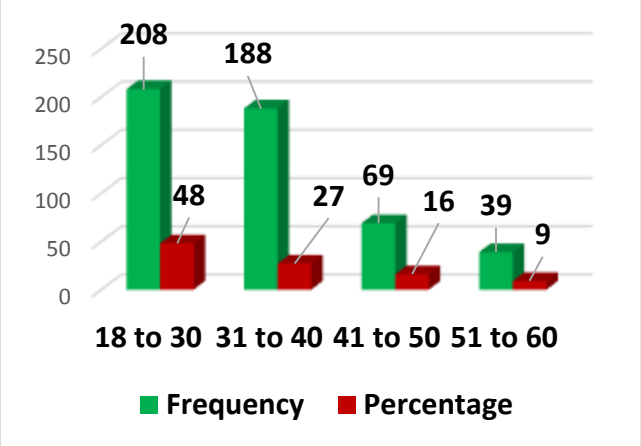

Figure-2. Distribution of blood donors according to the age (n=434)

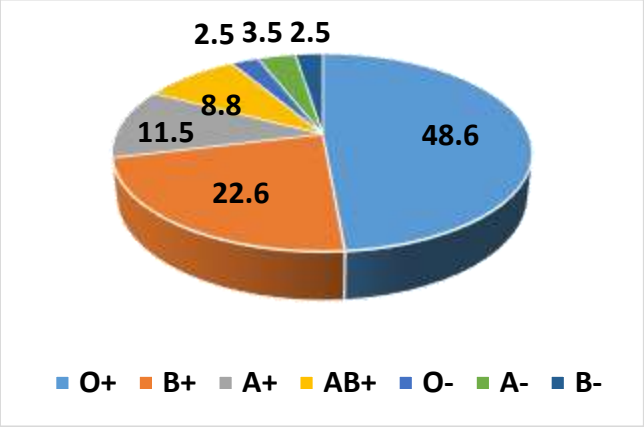

Figure-3 Distribution of blood donors according to the blood group (n=434)

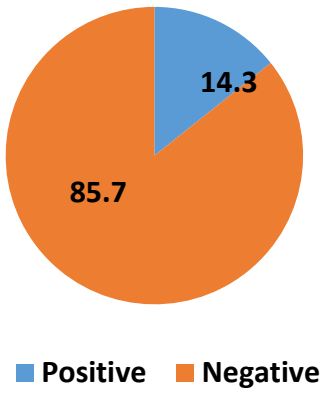

Figure-4 Prevalence of delta virus (n=434)

Table-1 Prevalence of delta virus according to age group (n=434)

Age group	Hepatitis D Positive	Negative	Total	P-value
18-30	30	178	208	
31-40	15	103	188	
41-50	9	60	69	0.661
51-60	8	31	39	
Total	62	372	434	

Table-2 Prevalence of Delta virus with respect to gender distribution among 434 blood donors

Gender	Hepatitis D Positive	Negative	Total	P-value
Male	61	359	420	0.22
Female	01	13	14	
Total	62	371	434	

Table-3 Prevalence of delta virus according to blood groups of 434 blood donors

Blood groups	Hepatitis D Positive	Negative	Total	P-value
O+	36	175	211	
B+	7	91	98	
A+	10	40	50	0.179
AB+	6	32	38	
O-	1	10	11	
A-	2	13	15	
B-	0	11	11	
Total	62	372	434	

DISCUSSION

This study was conducted to evaluate the prevalence of Hepatitis D virus in reactive HBsAg blood donors, majority of young people are blood donors in our population as we found 48.0% and 27.1% individuals with age groups of 18-30 years and 31-40 years respectively. Similarly, García et al [11] reported that according to age distributions of blood donors, young adults with ages 18–35 years are the majority of the blood donor population, who contribute nearly 80 % of blood donations. In our study most of the cases 96.8% were males, while only 3.2% were females. Consistently Nayagam et al [12] reported that irrespective of religion or ethnicity, 42 (21%) women and 158 (79%) were examined. Out of all 434 reactive HBsAg blood donors, 14.3% were found with positive delta virus infection. Consistently, Chang et al [13] reported that out of 854 samples, 154 (18%) were HBV-DNA positive. On other hand in a study by Sultanik et al., 2016 [14] showed that 3.38% (6/177) were anti-HDV antibodies carriers while conducting their study on HDV seroprevalence population of HBsAg carrying blood donors.

The prevalence of our study is higher as compared to others as Ramírez-Soto et al [15] reported that the anti-delta antibody prevalence rate of 11.2% among healthy HBsAg carriers. Some other old studies also reported lower prevalence of delta virus in HBV reactive cases as in Saudi blood donors reported rates of 8%, 5.4%, and 6.7% by Goyal et al, [16], Sagnelli et al, [17] and El-Hazmi and Wang et al [18] from Saudi Arabia and also 3.8%, 0.5%, and 5% from the United States, and Canada [19]. Similarly, Italian based study conducted recently found that HDV prevalence was 8.4% [20]. In a study from Ismalia conducted by Botelho-Souza et al, [21] stated that the blood donors with HBsAg-positive had HDV pervasiveness 4.7%. This difference may be due to the increased prevalence of HDV because old studies showed low HDV prevalence as compared to recent data in HBV infected populations. However, adequate data has been published at the local level, In order to contribute to a better policy for the treatment of this infection, reliable data on the seroprevalence of VHD are required.

Many studies for HDV among asymptomatic HbsAg carriers have been conducted worldwide and found the rate of anti-HDV seropositivity to be 21.8% [22] and 5.8% in Iran [23]. The control of HBV infection has resulted in a decrease in HDV in developing countries. As a result of improved public health and HBV vaccination standards, in a significant reduction over the last two decades. The decrease in HBsAg carriers deprives HDV of the HBV network required for existence, reducing the virus's circulation and medical impact [24].

HDV infections, like other transfusion-transmitted infections, have a higher transmission risk in high blood utilized patients. HBsAg screening ensures a high level of protection in the prevention of infectious HDV. Some HDV infections, still, can be missed by HBsAg tests by reason of specific HBV infections. HDV infection is also extremely common among hep-atitis patients in Turkey's Western, Eastern, and South-Eastern regions [25]. HDV is crucial. Anti-HDV testing is a simple and inexpensive indicative technique. Though, supplementary HBV tests for perceiving HBV, such as HBV-DNA testing are a viable option that are both less expensive and operative.

In this study O positive blood group was the most common in 48.6% of the cases followed by B positive, A positive, AB positive, O negative, A negative, and B negative were noted with percentages of 22.6%, 11.5%, 8.8%, 2.5%, 3.5%, and 2.5% respectively. Similarly, Liu et al [26] reported that blood group O and Rh-D positivity were both associated with increased HBV infection. Servant-Delmas et al [27] demonstrated that blood group O+ was the commonest and Oh - was the least frequent among blood donors. This is also in agreement with the studies performed on blood donors. No particular studies were published at the national or international level regarding the association between HDV and ABO blood groups. This was the first study which showed there are no

significant differences were found in the prevalence of delta virus in HBV infected blood donors according to age, gender, and blood groups.

CONCLUSION

It is concluded that the prevalence of HDV is 14.3% in Hepatitis B reactive healthy donors. This is a higher prevalence as compared to previously published studies. No such adequate recent data is available at the local level. More research is needed on this event, to provide adequate knowledge, which will be helpful to clinical and laboratory investigators, and physicians to reduce the burden of liver disease caused by HBV and HDV co-infection.

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