Prevalence of Hepatitis B, Hepatitis C and HIV Among Blood Donors in Bisha (Saudi Arabia)

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Abstract

Introduction: Blood donation is considered an essential practice that saves millions of lives; however, unsafe transfusion practices also put millions of people at risk of transfusion-transmissible infections. This study is aimed to describe the seroprevalence of hepatitis B virus, hepatitis C virus, and human immunodeficiency virus among blood donors in King Abdulla hospital (Bisha, KSA) in the duration from March 2013 to April 2019.

Methods: The study design is a retrospective cross-sectional hospital-based. The study investigates the percentages of the hepatitis B virus, hepatitis C virus, and human immunodeficiency virus among blood donors. The included samples were 16218. All samples were tested in the central blood bank by ELISA methods. Data were analyzed by SPSS 23 (2015).

Result: All the blood donors were males. The age of donors ranged from 18 to 55 and most of them were in the age group 20-30 years (37.3). The prevalence of HBC, HCV and HIV were 0.5%, 0.3% and 0.1% respectively. Percentages reported in Bisha were the lowest across Saudi Arabia.

Conclusion: TThe percentages of positive blood donors for HCV, HBV, and HIV in Bisha are lowers across Saudi Arabia. All the blood donors were males of young age (24yrs). Only 0.8% of the participant donors were positive for viral hepatitis or HIV. Among the positive donors, the most common infection was HBsAg (0.5%) followed by HCV (0.3 %) and HIV (0.1%). Although the Hepatitis

B virus was considered hyperendemic in Saudi Arabia, Bisha showed a low percentage (0.3%).

We recommend enhancing immunization programs and public awareness about transmission routes to decrease the percentages of blood-borne viruses. Pre-marital, antenatal screening, and pre-recruitment investigations can limit viral transmission. Blood bank screening of donors is crucial in the screening and prevention of viral hepatitis and HIV infections.

Keywords: HBV, HCV, HIV, blood donors, Saudi, blood bank.

Introduction

Blood transfusion is a life-saving intervention procedure that has a vital role in patient management within health care systems. WHO considered the provision of adequate supplies of safe blood and blood products that are accessible to all patients who require transfusion as a right (Giriyan et al., 2017; Yahia, 2020). Inappropriate transfusion of blood or blood products can lead to serious consequences for the recipients, including hypersensitivity reactions, blood hemolysis, and transmission of infectious agents (Giriyan et al., 2017; Yahia, 2020).

Viral hepatitis and Human immunodeficiency viruses are among the most common transfusion-transmitted infections. They can cause various diseases, especially liver disease and AIDS (Dwyre, Fernando, & Holland, 2011; Rehermann & Nascimbeni, 2005). Infection with the hepatitis B virus (HBV) and hepatitis C virus (HCV) are major global health problems (Flichman et al., 2014). These viruses can cause severe liver diseases such as liver cirrhosis, liver failure, and hepatocellular carcinoma (HCC) (Walter et al., 2011). Such viral infections are associated with increased mortality.

Safe blood comes either from an altruistic voluntary donor who donates blood without any expectations or professional/paid donors (Chandrashekar & Kantharaj, 2014). Blood donors can be categorized into repeat voluntary donor who donates once a year, replacement donors, or occasional voluntary donors. Repeat voluntary is considered safer than occasional voluntary donors (Allain, 2011; Chandrashekar & Kantharaj, 2014; Jain & Gupta, 2012).

To guarantee safe blood transfusion, policymakers and blood banks put guidelines and regulations for screening both the donor and the donated blood. Commonly blood banks depend on enzyme-linked immunosorbent assay (ELISA) techniques for donor screening. Advances in technology provide other sophisticated and expensive techniques and methods for screening, such as chemiluminescence /enzyme-linked fluorescence assay, red cell antibodies screening being adopted by many blood banks, and the newer gel/ bead techniques and nucleic acid testing (Chandrashekar & Kantharaj, 2014; Sniecinski, O'donnell, Nowicki, & Hill, 1988).

This study is aimed to describe the seroprevalence of hepatitis B virus, hepatitis C virus, and human immunodeficiency virus among healthy blood donors in King Abdulla hospital (Bisha) in the duration from March 2013 to April 2019.

Materials and methods

Study design and setting

The study design is a retrospective cross-sectional hospital based (Rezigalla, 2020). It was conducted in King Abdullah Hospital (Bisha) from March 2013 to April 2019. The sample size is total coverage. All subjects presented to the blood bank for blood donation were included. All the subjects were screened for hepatitis B virus and hepatitis C virus and HIV as part of hospital protocols and guidelines for blood donation and transfusion (Yahia, 2020).

Blood screening techniques

All the laboratory screening was done in the central blood bank in King Abdullah Hospital (Bisha). Markers of viral infections were detected by third-generation enzyme immunoassays for hepatitis B surface antigen (HBsAg), HCV antibodies, HIV-1, and HIV-2 antibodies.

Data collection and procedure

Data were obtained from the record of the central blood bank in King Abdullah Hospital (Bisha). The total number of obtained records was16218. The obtained records were the sex, age, and nationality of the donors and the results of HBV, HCV, and HIV.

Data analysis

The obtained data were analyzed via SPSS 23 (2015) (SPSS, Chicago, IL). Results were presented as descriptive statistics. A P value of $\leq .05$ was considered significant.

Ethical considerations

The study was ethically approved by the Ethics Committee, College of Medicine, University of Bisha.

Results

The demographic data showed that all the donors were males. The mean age of the study population was 24 (20-30) years. The study population was predominantly of Saudi Arabia nationality (Table1).

Table 1: The demographic data of the blood donors in King Abdulla Hospital (Bisha, Saudi Arabia) in the duration from March 2013 to April 2017 (n=16218)

Demographic variable		Frequency	Percentage %
Sex	Male	16218	100
	Female	0	0
Age	<20	3150	19.4
	20-30	6054	37.3
	30-40	4120	25.4
	40-50	2555	15.8
	>50	339	2.1
Nationality	Saudi	15936	98.3
	Non-Saudi	282	1.7

Serological markers of the three viruses HBV, HCV, or HIV were detected in 131 (0.8 %) of all donors. Among the positive donors, the most common infection was HBsAg (0.5%) followed by HCV (0.3 %) and HIV (0.1%) (Figure 1).

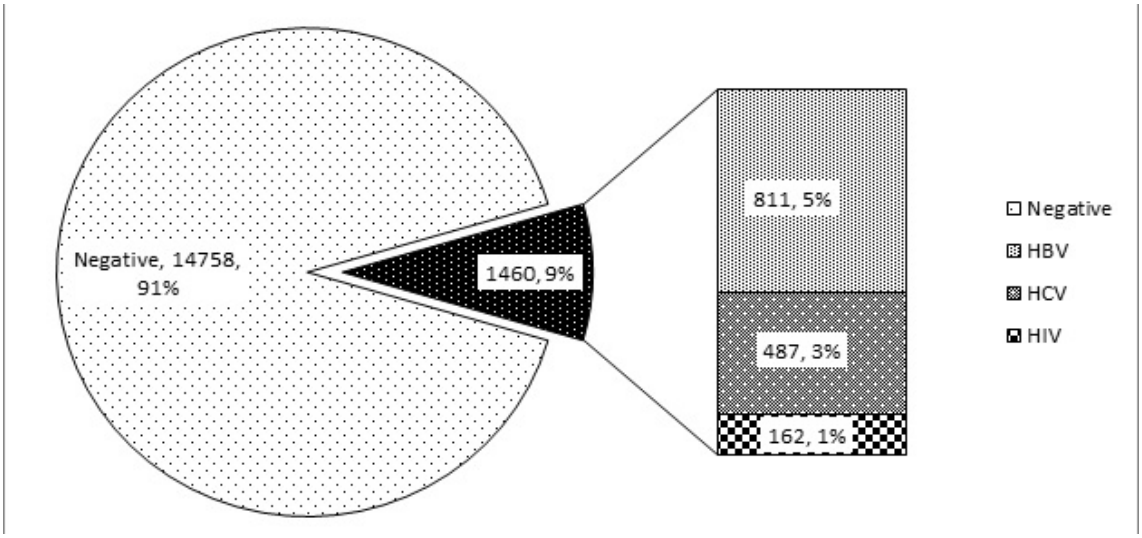

Figure1. Percentage of viral hepatitis and HIV among blood donors in King Abdullah hospital (Bisha, Saudi Arabia)

Discussion

The Kingdom of Saudi Arabia (KSA) has perceived a decline in the prevalence of the three common hepatotropic viruses during the last decades despite sporadic reports [12] (Ayman A. Abdo & Sanai, 2015). The decline was referred to mass immunization program against HBV launched in 1990 and obligatory blood bank screening (Ayman A. Abdo & Sanai, 2015; Abdullah, 2013). Also, it was partially attributed to the changes in living conditions and increased awareness about social and clinical practices. Transmission of viral hepatitis among Saudi was related to horizontal mode during childhood rather than vertical. For non-Saudis, upon recruitment, they are subject to a number of investigations. Blood screening for recruitment should show negative test results for viral hepatitis and HIV, besides other diseases. This method decreases the potential of new cases from outside the country. Despite the measures applied for Saudi and non-Saudi, many local studies reported new cases of viral hepatitis and HIV(Ayman A. Abdo & Sanai, 2015; Alaidarous et al., 2018; AlMutairi et al., 2016; Elbjeirami, Arsheed, Al-Jedani, Elnagdy, & Hazem, 2015; Sarah & Ali, 2016) [12, 14-17]. The reported studies cover different regions within KSA. All of these studies support the current Findings. In the current study, 0.9% of the cases were positive for viral hepatitis and HIV. The studied samples include blood donors of all nationalities.

The current percentage of HBV was the lowest across the kingdom except for the result of Alaidarous et al. [2018] in Majmaah(Alaidarous et al., 2018). The highest percentage was reported in Hail by Sarah and Ali (2016) and followed by Al-faleh (2003) (Al-Faleh, 2003; Alaidarous et al., 2018; Sarah & Ali, 2016).

Hepatitis B virus was considered hyperendemic in Saudi Arabia (Al-Humayed, 2017; Mehdi, Pophali, & Rahim, 2000). The estimated prevalence of HBV in blood donors ranges from 2.7% to 9.8% [18-20]. The prevalence of HBV markers in Bisha is lower than that reported in the Eastern region (6.7%), the southwestern region (5.4%), and the estimated overall prevalence in Saudi Arabia. Numerous surveys have shown that there

are marked regional variations in the prevalence of HBV (Alcantara, Alenezi, Cruz, & Alcantara; Arya et al., 1985; M. El-Hazmi, 1989; ELHAZMI, 1986)

Meanwhile, the percentage of HCV in the current study was the second-lowest before Alaidarous et al. (2018) in Majmaah(Alaidarous et al., 2018). The highest percentage of HCV among the KSA was reported by Sarah and Ali (2016) in Hail and followed by Ankra-Badu et al. (2001) in Al-Khobar (Ankra-Badu, Ahmad, Sowayan, & Bashawri, 2001; Sarah & Ali, 2016). The prevalence of HCV infections among blood donors showed that the infection rates range from 0.4 to1.1% %. (M. M. El-Hazmi, 2004; Madani, 2007; Mehdi et al., 2000). Declines in HCV prevalence rates were also noted in the blood bank database of King Khalid University Hospital in Riyadh, from 0.58% in 1996 to 0.08% in 2006 (Ayman A Abdo, Sanai, & Al-Faleh, 2012). The percentage of HIV in the current work supports the previous reports of Alaidrous et al. and Ankra-Badu et al. (2001) (Ankra-Badu et al., 2001). All of these studies showed lower percentages of HIV among blood donors. The highest percentage across KSA was reported by Elbjeirami et al. (2015) and followed by Sarah and Ali (2016) in Hail (Elbjeirami et al., 2015; Sarah & Ali, 2016). The current result was the third-lowest percentage (Elbjeirami et al., 2015).

The prevalence of HIV in this study was 0.1 % among the study population. Less than this prevalence rate of HIV (0.0%) was stated among blood donors at King Khalid University Hospital Riyadh, KSA over a period of 3 years from January 2000 to December 2002(M. M. El-Hazmi, 2004). The 0.1% HIV prevalence among blood donors in our study is much lower than that for high-income countries and many countries in sub-Saharan Africa, where HIV prevalence ranges from 3% to 5% (Bloch, Vermeulen, & Murphy, 2012).

In regards to the variation in the prevalence of the different viral infections in KSA, there is no solid scientific evidence in the literature. Despite the types of the infection, the increase in rates can be related to increases in screening or donation concerning the different regions.

Future studies and implications

The current findings support the effectiveness of the health policies and measurement, immunization programs, and public awareness regarding the limitation of viral hepatitis and HIV infections in Saudi Arabia. The pre-recruitment investigations provide prescreening that limits the spread of viral hepatitis and HIV infections. The screening program of blood donors prevents the spread of viral infections through blood or blood products and provides valuable and accurate information to policymakers. The young age of blood donors reflects the public awareness about the importance of blood donation in saving lives and the expected benefits from donation as a practice.

Future studies should target other regions within Saudi Arabia. Other blood screening methods, such as antenatal clinics, should be included in studies because it provides information about females, as all the blood donors were males. Moreover, the conduction of meta-analysis studies will provide a comprehensive database concerning viral hepatitis and HIV infections.

Conclusion

The percentages of positive blood donors for HCV, HBV, and HIV in Bisha are lowers across Saudi Arabia. All the blood donors were males of young age (24yrs). Only 0.8% of the participant donors were positive for viral hepatitis or HIV. Among the positive donors,

the most common infection was HBsAg (0.5%) followed by HCV (0.3 %) and HIV (0.1%). Although the Hepatitis B virus was considered hyperendemic in Saudi Arabia, Bisha showed a low percentage (0.3%).

We recommend enhancing immunization programs and public awareness about transmission routes to decrease the percentages of blood-borne viruses. Pre-marital, antenatal screening, and pre-recruitment investigations can limit viral transmission. Blood bank screening of donors is crucial in the screening and prevention of viral hepatitis and HIV infections.

Ethical consideration

Permission of study conduction was taken from the administration of King Abdallah hospital (Bisha) and College of Medicine, University of Bisha.

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معدل انتشار التهاب الكبد الوبائي B والتهاب الكبد الوبائي C وفيروس نقص المناعة البشرية بين المتبرعين بالدم في مدينة بيشة (المملكة العربية السعودية)

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المُستَخلَص

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مقدمة: يعتبر التبرع بالدم ممارسة أساسية تنقذ حياة الملايين. ومع ذلك ، فإن ممارسات نقل الدم غير الآمنة تعرض الملايين من الناس لخطر العدوى المنقولة عن طريق نقل الدم. تهدف هذه الدراسة إلى وصف الانتشار المصلي لفيروسات الالتهاب الكبدي الوبائي من النوع B و C وفيروس نقص المناعة البشرية بين المتبرعين بالدم في مستشفى الملك عبد الله (بيشة، المملكة العربية السعودية) في الفترة من مارس 2013 إلى أبريل 2019.

الطرق: نوع الدراسة مستعرضه استرجاعيه قائمة على مستشفى. تبحث الدراسة في النسب المئوية لفيروس التهاب الكبد الوبائي B وفيروس التهاب الكبد الوبائي C وفيروس نقص المناعة البشرية بين المتبرعين بالدم. شملت العينة 16218 متبرع. تم اختبار جميع العينات في بنك الدم المركزي بطرق الاليزا. تم تحليل البيانات بواسطة برنامج SPSS (2015) النسخة 23.

النتيجة: جميع المتبرعين بالدم كانوا من الذكور. تراوحت أعمار المتبرعين من 18 إلى 55 سنه وكان معظمهم في الفئة العمرية 20-30 سنة (37.3). كان معدل انتشار فيروس التهاب الكبد الوبائي B وفيروس التهاب الكبد الوبائي C وفيروس نقص المناعة البشرية بين المتبرعين ٪0.5 و٪0.3 و٪0.1 على التوالي. وكانت النسب الواردة في بيشة هي الأدنى على مستوي المملكة العربية السعودية.

الخلاصة: إن النسب المئوية الإيجابية للمتبرعين بالدم لفيروس التهاب الكبد الوبائي B وفيروس التهاب الكبد الوبائي C وفيروس نقص المناعة البشرية بين المتبرعين الاقل في جميع أنحاء المملكة العربية السعودية. نوصي بتعزيز برامج التحصين والتوعية حول طرق الانتقال الذي يمكن أن يقلل من نسب العدوة بالفيروسات المنقولة بالدم. يمكن للفحص ما قبل الزواج وفحص ما قبل الولادة وفحوصات ما

قبل للتوظيف أن تحد من انتقال الفيروسات. يعد فحص بنك الدم للمتبرعين أمرًا بالغ الأهمية للمسوحات والوقاية من التهابات الكبدية الفيروسية وعدوى فيروس نقص المناعة البشري.

مفاتيح الكلمات: HIV، HCV، HBV، المتبرعون بالدم، السعوديون، بنك الدم.