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## RESEARCH ARTICLE

## Seroprevalence of Australia Antigen (HBsAg) among Blood Donors in Local Population

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### Abstract

- (1) To determine the Seroprevalence of HBsAg in the local population in and around Junagadh (Gujarat) from January-2011 to December-2014  
(2) To compare the prevalence of seropositivity of HBsAg with other regions in India

#### Materials and methods:

A retrospective study was conducted on blood donors over a period of 4 years to assess the prevalence of hepatitis B virus infection. Two different testing methods (1) rapid HBsAg card test (HEPASCAN) and (2) HBsAg ELISA test (MICROSCREEN) were used for screening purpose. First method was based upon the principle of Rapid Visual Single Step Immuno-chromatographic Assay and Second method was based upon the principle of ELISA.

#### Results:

A retrospective study was carried on **21,918** blood donors out of which **13,246(60.434%)** were in-house donors and **8,672(39.566%)** were outdoor (camp) donors. **19,955 (91%)** donors were male & **1,963(9%)** donors were female. Out of 21,918 blood units collected, **1,121(5.115%)** blood units were discarded. Out of 1,121 discarded units **166(14.810%)** units were HBsAg reactive. The prevalence of HBsAg seropositivity was found to be **0.757%**.

#### Conclusion:

Blood donors represent apparently healthy population of a particular geographical region. Occasionally out of them, some people are found to be reactive for Australia Antigen and many other similar antigens as well as antibodies. So to reduce Seroprevalence of HBsAg, more sensitive screening assays and proper donor selection are must.

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## INTRODUCTION

Hepatitis B infection has become an issue of global importance. Hepatitis B causes an estimated 1-2million deaths per year worldwide<sup>[1, 2]</sup> and it is estimated that there are 300 million carriers of Hepatitis B virus in the world. Countries are classified on the basis of endemicity of Hepatitis B virus infection into high (8% or more) (like equatorial Africa, South East Asia, China, parts of South America), intermediate (2-7%) (like Eastern Europe, Middle East, South Asia) or low (<2%)(developed countries as North America and Australia) incidence countries<sup>[1]</sup>.The prevalence of chronic hepatitis B infection in India ranges from 2-10% as shown by different

studies<sup>[2]</sup>. This infection is the leading cause of morbidity and mortality not only because of the acute illness but also due to its chronic sequel like chronic hepatitis, cirrhosis and hepatocellular carcinoma. Currently there are four recognized modes of hepatitis B infection – mother to child at birth (perinatal) , contact with infected person(horizontal) , sexual contact and parenteral route through blood/fluids. HBsAg in the serum is the earliest marker of active HBV infection (acute/chronic) being detectable even before elimination of transaminases and onset of clinical illness.

The strategies used to reduce the transfusion transmitted infections includes improving donor selection , testing the donated blood for specific antibodies against infectious agents , using autologous transfusion<sup>[3,4]</sup> but the transmission of disease still occurs<sup>[5]</sup> because of the inability to detect the disease in window phase of the infection , prevalence of asymptomatic carriers , false negative results , immunologically variant viruses and laboratory testing errors<sup>[6]</sup>.To understand and assess the magnitude and dynamics of transmission of a disease in a community and for its control and prevention , the assessment and study of its prevalence is very important .

## Materials and methods

The study was conducted in the blood bank, Department of Pathology, GMERS Medical College, Junagadh. It is a retrospective study. A total of 21,918 units of blood were collected from donors (In-house & Outdoor-camp) from January 2011 to December 2014.They were carefully selected for donation after satisfactorily answering the donors questionnaire and passing the physical examination conducted by the physician-in-charge. All the blood samples were screened for Hepatitis B surface antigen using Two different testing methods (1) rapid HBsAg card test (HEPASCAN) and (2) HBsAg ELISA test (MICROSCREEN) for qualitative detection (screening) of HBsAg in serum/plasma. All the tests were performed in accordance with the manufacturer's instructions with adequate controls.

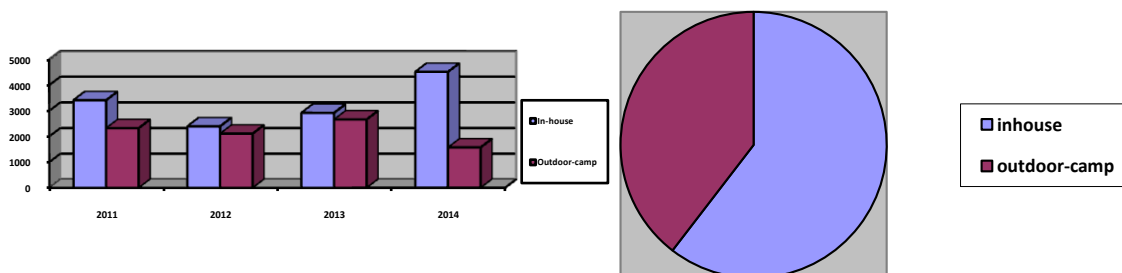
## Results

A total of 21,918 donors were screened over a period of 4 yrs from January 2011 to December 2014, out of which **13,246(60.434%)** were in-house donors and **8,672(39.566%)** were outdoor (camp) donors. The year wise percentage is shown in the following table 1.

Table 1: trends in Outdoor-camp and In-house blood donation (Year-wise)

YEAR	TOTAL No. of Donors	No. of In-House Donors	Percentage of In-House Donors	No. of Outdoor-camp Donors	Percentage of Outdoor-camp Donors
2011	5736	3412	59.484%	2324	40.516%
2012	4507	2396	53.162%	2111	46.838%
2013	5583	2920	52.302%	2663	47.698%
2014	6092	4518	74.163%	1574	25.837%
TOTAL	21918	13246	<b>60.434%</b>	8672	<b>39.566%</b>

Figure1: trends in Outdoor-camp and In-house blood donation (Year-wise)

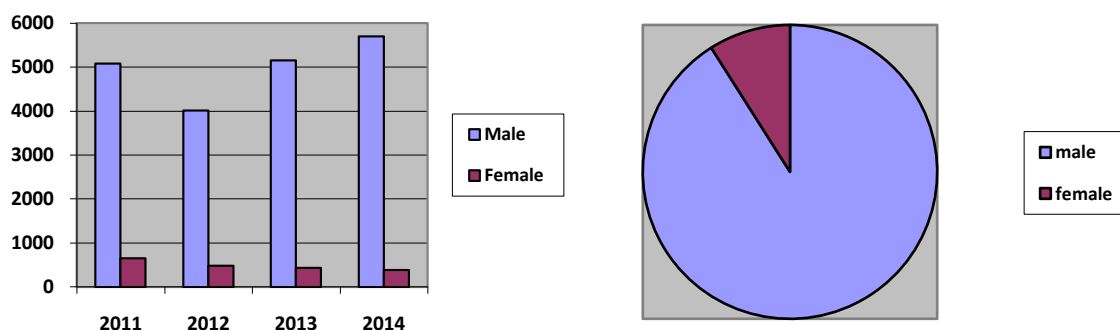


Out of 21,918 donors **19,955(91%)** were male donors and **1963(9%)** were female donors. The year wise percentage is shown in the following table 2.

Table 2: trends in Male &amp; Female blood donation (Year-wise)

YEAR	TOTAL No. of Donors	No. of Male Donors	Percentage of Male Donors	No. of Female Donors	Percentage of Female Donors
2011	5736	5084	88.633%	652	11.367%
2012	4507	4017	89.128%	490	10.872%
2013	5583	5152	92.280%	431	7.720%
2014	6092	5702	93.600%	390	6.400%
TOTAL	21918	19955	<b>91.00%</b>	1963	<b>09.00%</b>

Figure 2: trends in Male &amp; Female blood donation (Year-wise)



Out of 21,918 blood units collected, **1,121(5.115%)** units were discarded. Out of 1,121 discarded units **166(14.810%)** units were HBsAg reactive. The prevalence of HBsAg seropositivity was found to be **0.757%**. The year wise percentage is shown in the following table 3. The Year wise Percentage of Blood units discarded due to HBsAg Reactivity is shown in table 4.

Table 3: Incidence of HBsAg among donors during 2011-2014

YEAR	TOTAL No. of Donors	TOTAL No. of Bags Discarded	Percentage of Bags Discarded	TOTAL No. of HBsAg Reactive Units	Percentage of HBsAg Reactive Units
2011	5736	227	3.958%	41	0.715%
2012	4507	360	7.987%	39	0.865%
2013	5583	210	3.761%	35	0.627%
2014	6092	324	5.318%	51	0.837%
TOTAL	21918	1121	5.115%	166	<b>0.757%</b>

Table 4: Percentage of Blood units discarded due to HBsAg Reactivity during 2011-2014

YEAR	TOTAL No. of Bags Discarded	TOTAL No. of HBsAg Reactive Units	Percentage of Blood units discarded due to HBsAg Reactivity
2011	227	41	18.062%
2012	360	39	10.833%
2013	210	35	16.667%
2014	324	51	15.741%
TOTAL	1121	166	<b>14.810%</b>

## Discussion

Table 5: Comparison of Seroprevalence of HBsAg among Blood Donors in different studies

Name of Study	Year	Place	Seroprevalence
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Srikrishna et al [7]	1999	Bangalore	1.86%
Chhattoraj et al [8]	2008	Pune	0.99%
Karandeepsinh et al [9]	2009	Costal Karnataka	0.62%
Gagandeep kaur et al [10]	2010	Chandigarh	0.65%
S Gulia et al [11]	2011	Vizianagaram	2.48%
Poojaba Jadeja et al [12]	2011	Udaipur, Rajasthan	1.32%
Present study	2014	Junagadh ,Gujarat	<b>0.757%</b>

The overall prevalence of HBsAg seropositivity in blood donors in local population in our study was noted 0.757% which is comparable with the other studies as mentioned above in table no.5.

According to India's Drugs and Cosmetics Act (1945), each blood unit has to be tested for hepatitis B virus infection [13]. In our study, the overall Seroprevalence of HBsAg was observed to be 0.757%. According to the WHO classification, this part of the Gujarat qualifies as a low prevalence area (less than 2%). The data providing a picture of hepatitis B infection burden in India has come from HBsAg Seroprevalence studies (Table 5). Comparison with the other parts of India, the present study shows low Seroprevalence of hepatitis B infection in Gujarat.

If we compare the HBsAg positivity in other developing countries of the world the rate is quite high as compared to India. Table 5 shows prevalence of HBsAg in other countries.<sup>[14,15,16]</sup>

Table 6: prevalence of HBsAg in other countries

Country	% of HBsAg Positivity
Egypt	39.4
Indonesia	8.8
Ghana	15.0
Nepal	2.5

This variation in the prevalence of hepatitis B infection in different countries depends upon a complex mix of behavioral, environmental and host factors, incidence and age of primary infection. It is lowest in areas with high standards of living and highest in areas with low socio-economic levels.

#### Conclusion & Recommendations:

Blood donors represent apparently healthy population of a particular geographical region. Occasionally out of them, some people are found to be reactive for Australia Antigen and many other similar antigens as well as antibodies. So to reduce Seroprevalence of HBsAg, more sensitive screening assays and proper donor selection are must. Ensuring the safety of patients by reducing the residual risk of transfusion transmitted hepatitis is the concern of every transfusion center. Pre-donation counselling, donor self-exclusion and ensuring 100% voluntary blood donation will be effective in decreasing the hepatitis B infection rate. This study provides a helpful guide in reducing the residual risk of transfusion-transmitted hepatitis not only in India, but also in the other developing countries of the world.

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