Prevalence of Hepatitis B among Blood Donors in Iran: A Systematic Review and Meta-analysis

Sajad Alizadeh, 2,3 Iraj Pakzad, 4,6 Kouresh Sayehmiri, 6 Reza Pakzad and 1 Parisa Darvishi
1Ilam University of Medical Sciences, Ilam, Iran
2Department of Microbiology, Medical School, Ilam University of Medical Sciences, Ilam, Iran
3Clinical Microbiology Research Center, Ilam University of Medical Sciences, Ilam, Iran
4Psychosocial Injuries Research Center, Ilam University of Medical Sciences, Ilam, Iran
5Social Medicine Department, Medicine Faculty, Ilam University of Medical Sciences, Ilam, Iran
6Department Epidemiology, Medical School, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Iraj Pakzad, Department of Microbiology, School of Medicine, Ilam University of Medical Sciences, Ilam, Islamic Republic Iran Tel: 980841227109 Fax: 9808412227136

ABSTRACT

The global epidemic of Hepatitis B virus (HBV) is one of the most serious public health problems in the world and Blood transfusion is one of the most important transmission pathways of HBV. The present study was conducted to determine the prevalence of Hepatitis B in blood donor in Iran. This study was constructed based on the computerized literature database. English and non-English Articles were searched in PubMed database, ISI Web of Science, Iranmedex, Magiran, Google Scholar, SID, Scientific Journal of Iran Blood Transfusion Organization (SJIBTO) and Directory of Open Access Journals (DOAJ) from 1996 to 2008. Infection rates and 95% CI calculated by random affect model. Statistical analyses were performed using STATA 10.0, R Ver. 2.3 and ArcGIS 3.2a was used for map construction. Thirty papers from 83 studies involving 23671286 patients met our inclusion criteria. The prevalence of HBV infection in blood donors was 0.7% (CI 95: 0.5-0.8%). The highest rate of prevalence of hepatitis B in blood donors were found in Gilan,-Mazandaran,-Golestan and Semnan provinces with 1.1% (CI 95:0.6-1.6%). Prevalence of hepatitis B in blood donors from 1996-2008 is decreased, therefore national vaccination of hepatitis B after 1993, awareness programs and screening of bloods transfusion has led this fact.

Key words: Hepatitis B, prevalence, blood donors, Iran, meta-analysis

INTRODUCTION

Hepatitis B virus (HBV) is one of the most important causes of hepatic infectious diseases in humans. Hepatitis B has a global distribution with a prevalence of 360 million cases of the chronic type of the disease. About 600,000 deaths occur every year as a result of the acute and chronic consequences of HBV infection. About 45% of the world population reside in hyper-endemic where prevalence of Hepatitis B surface antigen (HBsAg) is more than 8, 43% live in midendemic areas where HBsAg prevalence is 2 to 7 and 12% live in hypo-endemic areas where HBsAg prevalence is less than 2% (Merican et al., 2000; Lavanchy, 2004; Mast et al., 2005). According to the report of World Health Organization and Centers for Disease Control and Prevention), prevalence of chronic Hepatitis B infection in Iran is between 2-7% (Poorolajal and Majdzadeh,
In different parts of the world, prevalence of HBV infection is rates ranging from 0.1 to 20% (Alaviani et al., 2007). Generally, 45% of the world population lives in high prevalence regions (Hepatitis B surface antigen positivity rates > 8%), resulting in the massive global burden associated with the infection (Alexander and Kowdley, 2006). The Middle East, Bahrain, Iran and Kuwait are areas of low endemicity. Iraq and the United Arab Emirates have intermediate endemicity and Jordan, Oman, Palestine, Yemen and Saudi Arabia have high endemicity (Andre, 2000). At present, vaccination is the most effective and cost-saving means of prevention of HBV infection (Poorolajal and Majdzadeh, 2009). Hepatitis B vaccine was introduced within National Immunization Program (NIP) in Iran in 1993 for all neonates and vaccination of high risk groups and teenagers under 18 years old since 2006 (Hassan and Ziba, 2007). In order to prevent HBV transmission through blood transfusion in Iran serological screening for HBsAg was implemented (Said, 2011). Ali et al. (2011) reported that prevalence rate of Hepatitis B in Pakistani professional blood donors more than 5%, volunteer blood donors less than 5% Ali et al. (2011) in a study in Mexico. Prevalence of Hepatitis B in blood donors was 3.3% (95% CI, 3.01-3.24) in Yemen between 2000-2005 (Bajubair et al., 2008) found prevalence of HBsAg to be 8% in healthy volunteers, 10.8% in blood donors (Bajubair et al., 2008). In Thailand (Chimparlee et al., 2011) indicted the prevalence of HBV infection in new blood donors has decreased gradually from 7.1% in 1988 to 2.6% in 2000 (Chimparlee et al., 2011).

**Objectives:** This study aims to evaluate the prevalence rate of Hepatitis B in blood donors in Iran according to year and geographic areas of country.

**METHODOLOGY**

**Eligibility criteria:** Cross sectional studies about prevalence of HBV among Iranian blood donor and No language, publication date, or publication status restrictions were imposed to our study.

**Information sources and search:** Literatures on Published studies in the English and Persian language on HBV were acquired by searching PubMed database, ISI Web of Science, Iranmedex, Magiran, Google Scholar, SJD, Scientific Journal of Iran Blood Transfusion Organization (SJIBTO) and Directory of Open Access Journals (DOAJ) for relevant articles from 1990 to 2008 using a search criterion combination of the following key words: Hepatitis, blood donor, Hepatitis B, HBV, prevalence, incidence and Iran. To maximize the number of studies for our analysis, we also combined the above key words.

**Study selection, data collection process and data items:** All identified studies were screened and the articles were selected by reviewing their titles and/or abstracts. Two observers independently reviewed the full texts of the remaining articles. We excluded studies were (1) not published at full length, (2) studies with a sample size less than 20, (3) studies without specific sample origin. When participant recruitment overlapped by more than 30% in two or more articles by the same author(s), the one with the largest population of participants or most recently published was selected. HBV infection was defined by a positive result of HBV infection markers: Hepatitis B surface antigen (HBsAg), Hepatitis B e antigen (HBeAg), anti-Hepatitis B surface antibody (HBsAb) and anti-Hepatitis B core antibody (HBeAb); this was confirmed by ELISA or enzyme immunoassay (EIA), also molecular diagnosis by PCR.
Risk of bias in individual studies: We used funnel plot model to check the existence of publication bias in our article.

Planned methods of analysis: Variance of prevalence in each study was estimate using binomial distribution. Pooled estimation of prevalence was computed using random effects models. Heterogeneity between studies was tested with the Cochrane Q test (p<0.10 was considered as statistically significant heterogeneity) and the I² statistic (values of 50, 25 and 75% were defined to represent low, medium and high heterogeneity respectively). Analyses were made with STATA (version 10.0, Stata Corp., College Station, TX, USA) and SPSS ver. 19. The significance was measured at p<0.05. Subgroups analysis was done according to region, year and age group. Meta-regression was used to explore heterogeneity among studies (Sterne and Egger, 2001). And ArcGIS 3.2a was used for map construction.

RESULTS
Study selection: In a total of 83 studies identified 17 studies from international database, 55 studies from Iranian databases and 11 studies by manual searching. The 25 studies were excluded for lacked study criteria. The 8 studies were repeated and don’t involving in this study. The 5 studies lacked full text and were excluded. After full texts review, 16 studies were excluded (12 articles lacked study criteria and 3 studies were repeated). The remaining 30 studies were included in the analysis, reference numbers (Taheri Azbarni et al., 2008; Pedram, 2007; Attarpour Yazdi, 2009; Assarehzadegan et al., 2008; Salem et al., 2010; Rahimi-Movaghar et al., 2010) which had prevalence 26, 19, 52, 38, 94 and 50%, respectively, were excluded in analysis (Fig. 1).

It was impossible to integrate and estimate the general widespread of Hepatitis B infection because of the variety of personal characteristics in the accepted studies. Therefore, the studies were divided to different categories based on participants, personal characteristics and then the results were categorized and analyzed in various groups. After searching the database, a total of 83 studies were identified, screened for retrieval. The characteristics of the 30 studies are given in Table 1. The number of patients participating in the studies ranged from 478 to 14599783. We draw the funnel plot model to decrease the bias of data (Fig. 2).

RESULTS OF INDIVIDUAL STUDIES
Synthesis of results: The 30 studies were conducted about Hepatitis B prevalence in blood donors in all parts of Iran from 1996 to 2008. The sample size different from 478 (Ramezani et al., 2007) to 14599783 (Kafi-Abad et al., 2009a) in different studies. The highest and lowest prevalence of infection were 2.5% (CI: 2.3-2.6%) (Kazeminejad et al., 2005) and 0.1% (CI: 0.05-0.15%) (Pourabuli et al., 2006), respectively. The meta analysis estimated of infection prevalence with 95% interval confidence. According, Hepatitis B prevalence in blood donor was 0.7% (CI: 0.5%-0.8%) (Fig. 3, Table 1). Heterogenicity test was significant (p<0.00001, I² = 99.9%).

Additional analyses: Trend B Hepatitis in Iran during 1996-2008, Meta-regresion line with 95% confidence interval indicated of decrease of prevalence of Hepatitis B (Fig. 4, 5).

Distribution of Hepatitis B in blood donor inside different parts of country: The 30 studies were conducted about Hepatitis B prevalence in blood donors in all parts of Iran from 1996 to 2008. Table 2 the highest and lowest number of studies were done in part 8 of the country (24 studies)
and part 5 of the country (14 studies). Meta analysis estimated infection prevalence with 95% interval confidence. The highest and lowest rate of prevalence of infection were found in group 3 (Gilan-Mazandaran-Golestan-Semnan) (Kazeminejad et al., 2005; Aghajanipoor and Zandieh, 2003; Ghanaii et al., 2008; Taheri Azbarni et al., 2008) 1.1% (CI:0.6-1.3%), group 5 (Isfahan-Yazd-Kerman-Chaharmahal-Bakhtiari) (Ardekani et al., 2002; Moniri et al., 2004; Pouraboli et al., 2006; Doosti et al., 2009; Ebrahimian et al., 2011) 0.3% (CI:0.2-0.5%) of the country, respectively. In parts 6 and 7 only one study carried out (Rezazadeh et al., 2006) (Fig. 6).
Table 1: Study design and sample size of studies included in the Meta-analysis Hepatitis B prevalence in blood donors in all parts of Iran

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Author</th>
<th>Ref. No.</th>
<th>Location</th>
<th>Sample population</th>
<th>Years</th>
<th>Method used</th>
<th>Prevalence</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kasaian L</td>
<td>(Kasaian and Jahromi, 2007)</td>
<td>Shiraz</td>
<td>597531</td>
<td>2002-2003</td>
<td>ELISA</td>
<td>0.0449</td>
<td>0.00473325</td>
<td>0.00511675</td>
</tr>
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<td>2</td>
<td>Vahid T</td>
<td>(Vahid et al., 2006)</td>
<td>Qazvin</td>
<td>39958</td>
<td>2001</td>
<td>ELISA</td>
<td>0.0108</td>
<td>0.008782</td>
<td>0.012188</td>
</tr>
<tr>
<td>3</td>
<td>Esmaeili H</td>
<td>(Esmaeili et al., 2009)</td>
<td>Bouchehr</td>
<td>30294</td>
<td>2006</td>
<td>ELISA</td>
<td>0.0234</td>
<td>0.0191841</td>
<td>0.029259</td>
</tr>
<tr>
<td>4</td>
<td>Afzali Hasani</td>
<td>(Afzali Hasani et al., 2002)</td>
<td>Kashan</td>
<td>43731</td>
<td>1986</td>
<td>ELISA</td>
<td>0.0066</td>
<td>0.006841</td>
<td>0.007358</td>
</tr>
<tr>
<td>5</td>
<td>Rezvandeh M</td>
<td>(Rezvandeh et al., 2006)</td>
<td>Hamedan</td>
<td>18506</td>
<td>2004</td>
<td>ELISA</td>
<td>0.0093</td>
<td>0.006709</td>
<td>0.009951</td>
</tr>
<tr>
<td>6</td>
<td>Esmaeili H</td>
<td>(Esmaeili et al., 2007)</td>
<td>Bouchehr</td>
<td>19627</td>
<td>2005</td>
<td>ELISA</td>
<td>0.0036</td>
<td>0.002762</td>
<td>0.004318</td>
</tr>
<tr>
<td>7</td>
<td>Ramazani A</td>
<td>(Ramazani et al., 2007)</td>
<td>Tabriz</td>
<td>478</td>
<td>2005</td>
<td>PCR</td>
<td>0.0022</td>
<td>0.002228</td>
<td>0.002325</td>
</tr>
<tr>
<td>8</td>
<td>Soalian M</td>
<td>(Soalian et al., 2006)</td>
<td>Arak</td>
<td>531</td>
<td>2008</td>
<td>PCR</td>
<td>0.0040</td>
<td>0.001376</td>
<td>0.003696</td>
</tr>
<tr>
<td>9</td>
<td>Agha Jami Poor K</td>
<td>(Agha Jami Poor and Zadeh, 2006)</td>
<td>Babol</td>
<td>16675</td>
<td>2002</td>
<td>ELISA</td>
<td>0.0134</td>
<td>0.011276</td>
<td>0.014724</td>
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<td>10</td>
<td>Masumi Z</td>
<td>(Masumi et al., 2006)</td>
<td>Isfahan</td>
<td>19620</td>
<td>2002</td>
<td>ELISA</td>
<td>0.0031</td>
<td>0.002928</td>
<td>0.003472</td>
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<td>11</td>
<td>Esmaeili H</td>
<td>(Esmaeili et al., 2006)</td>
<td>Jahrom</td>
<td>3000</td>
<td>2001</td>
<td>ELISA</td>
<td>0.0040</td>
<td>0.001741</td>
<td>0.006259</td>
</tr>
<tr>
<td>12</td>
<td>Mansour Ghani F</td>
<td>(Mansour Ghani et al., 2008)</td>
<td>Gorgan</td>
<td>32100</td>
<td>1997</td>
<td>ELISA</td>
<td>0.0045</td>
<td>0.004221</td>
<td>0.004779</td>
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<td>13</td>
<td>kameinejad V</td>
<td>(Kameinejad et al., 2006)</td>
<td>Gorgan</td>
<td>38820</td>
<td>2003</td>
<td>ELISA</td>
<td>0.0253</td>
<td>0.023419</td>
<td>0.026551</td>
</tr>
<tr>
<td>14</td>
<td>Ebrahimian Z</td>
<td>(Ebrahimian et al., 2011)</td>
<td>Isfahan</td>
<td>542705</td>
<td>2004</td>
<td>ELISA</td>
<td>0.0021</td>
<td>0.001978</td>
<td>0.002222</td>
</tr>
<tr>
<td>15</td>
<td>Ghassani F</td>
<td>(Ghassani et al., 2011)</td>
<td>Hamedan</td>
<td>42652</td>
<td>2006</td>
<td>ELISA</td>
<td>0.0049</td>
<td>0.004324</td>
<td>0.005516</td>
</tr>
<tr>
<td>16</td>
<td>Vossoughinia H</td>
<td>(Vossoughinia et al., 2010)</td>
<td>Mashhad</td>
<td>310518</td>
<td>2003</td>
<td>ELISA+PCR</td>
<td>0.0117</td>
<td>0.011162</td>
<td>0.012218</td>
</tr>
<tr>
<td>17</td>
<td>Tavabi Azizian Z</td>
<td>(Tavabi Azizian et al., 2008)</td>
<td>Rasht</td>
<td>49820</td>
<td>2003</td>
<td>ELISA</td>
<td>0.0048</td>
<td>0.003256</td>
<td>0.005262</td>
</tr>
<tr>
<td>18</td>
<td>Bozorgi SH</td>
<td>(Bozorgi et al., 2006)</td>
<td>Qazvin</td>
<td>48116</td>
<td>2002</td>
<td>ELISA</td>
<td>0.0045</td>
<td>0.003592</td>
<td>0.005008</td>
</tr>
<tr>
<td>19</td>
<td>Attarchi Z</td>
<td>(Attarchi et al., 2006)</td>
<td>Tehran</td>
<td>26645</td>
<td>2003</td>
<td>ELISA</td>
<td>0.0040</td>
<td>0.006073</td>
<td>0.006827</td>
</tr>
<tr>
<td>20</td>
<td>Torabi Zadeh</td>
<td>(Torabi Zadeh et al., 2006)</td>
<td>Ahvaz</td>
<td>39032</td>
<td>2005</td>
<td>ELISA</td>
<td>0.0069</td>
<td>0.005657</td>
<td>0.008943</td>
</tr>
</tbody>
</table>

Table 2: Hepatitis B prevalence in blood donors in all parts of Iran from 1996-2008

<table>
<thead>
<tr>
<th>Group No.</th>
<th>Regions</th>
<th>No. of studies</th>
<th>Prevalence</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tehran and suburban</td>
<td>2</td>
<td>0.005</td>
<td>0.004</td>
<td>0.006</td>
</tr>
<tr>
<td>2</td>
<td>Alborz-Qom-Markazi-Qazvin-Hamedan</td>
<td>4</td>
<td>0.007</td>
<td>0.004</td>
<td>0.01</td>
</tr>
<tr>
<td>3</td>
<td>Gilan-Mazandaran-Golestan-Semnan</td>
<td>4</td>
<td>0.011</td>
<td>0.006</td>
<td>0.016</td>
</tr>
<tr>
<td>4</td>
<td>North Khorasan-Khorasan Central-South Khorasan-SistaneBaluchestan</td>
<td>3</td>
<td>0.007</td>
<td>0.001</td>
<td>0.033</td>
</tr>
<tr>
<td>5</td>
<td>Isfahan-Yazd-Kerman-ChaharmahalBakhtiari</td>
<td>6</td>
<td>0.003</td>
<td>0.002</td>
<td>0.005</td>
</tr>
<tr>
<td>6</td>
<td>Kurdistan-Kermanshah-Ilam-Lorestan</td>
<td>1</td>
<td>0.006</td>
<td>0.006</td>
<td>0.007</td>
</tr>
<tr>
<td>7</td>
<td>East Azerbaijan-West Azerbaijan-Ardabil-Zanjan</td>
<td>8</td>
<td>0.006</td>
<td>0.004</td>
<td>0.007</td>
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<td>8</td>
<td>Hormozgan-Bushehr-Fars-Khuzestan-KohgelouyeBoyerahmad</td>
<td>2</td>
<td>0.008</td>
<td>0.004</td>
<td>0.012</td>
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<td>9</td>
<td>Unclassified</td>
<td>2</td>
<td>0.006</td>
<td>0.006</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Age distribution of prevalence of Hepatitis B in blood donor: All of 30 studies were done in undetermined age. In general, blood donor ranges 17 to 65 years old.
<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
<th>ES (95% CI)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Bam</td>
<td>0.00 (0.00, 0.00)</td>
<td>15375</td>
</tr>
<tr>
<td>2003</td>
<td>Shahrekord</td>
<td>0.00 (0.00, 0.00)</td>
<td>1120</td>
</tr>
<tr>
<td>2004</td>
<td>Esfahan</td>
<td>0.00 (0.00, 0.00)</td>
<td>542705</td>
</tr>
<tr>
<td>2006</td>
<td>Boushehr</td>
<td>0.00 (0.00, 0.00)</td>
<td>20294</td>
</tr>
<tr>
<td>2003</td>
<td>Rastan</td>
<td>0.00 (0.00, 0.00)</td>
<td>49820</td>
</tr>
<tr>
<td>2005</td>
<td>Boushehr</td>
<td>0.00 (0.00, 0.00)</td>
<td>19627</td>
</tr>
<tr>
<td>2006</td>
<td>Shiraz</td>
<td>0.00 (0.00, 0.00)</td>
<td>204419</td>
</tr>
<tr>
<td>2002</td>
<td>Esfahan</td>
<td>0.00 (0.00, 0.00)</td>
<td>16620</td>
</tr>
<tr>
<td>2008</td>
<td>Arak</td>
<td>0.00 (-0.00, 0.01)</td>
<td>531</td>
</tr>
<tr>
<td>2001</td>
<td>Jahrom</td>
<td>0.00 (0.00, 0.01)</td>
<td>3000</td>
</tr>
<tr>
<td>1997</td>
<td>Guilan</td>
<td>0.00 (0.00, 0.00)</td>
<td>221508</td>
</tr>
<tr>
<td>2002</td>
<td>Gharvin</td>
<td>0.00 (-0.00, 0.01)</td>
<td>48116</td>
</tr>
<tr>
<td>2005</td>
<td>Tehran</td>
<td>0.00 (-0.00, 0.01)</td>
<td>618029</td>
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<tr>
<td>2002</td>
<td>Shiraz</td>
<td>0.00 (-0.00, 0.01)</td>
<td>507553</td>
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<tr>
<td>2005</td>
<td>Khurasan.s</td>
<td>0.00 (-0.00, 0.01)</td>
<td>422886</td>
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<td>2001</td>
<td>Kashan</td>
<td>0.00 (0.00, 0.01)</td>
<td>600</td>
</tr>
<tr>
<td>2005</td>
<td>Hamedan</td>
<td>0.00 (0.00, 0.01)</td>
<td>8468</td>
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<tr>
<td>2007</td>
<td>Iran</td>
<td>0.01 (0.01, 0.01)</td>
<td>6499851</td>
</tr>
<tr>
<td>2003</td>
<td>Tehran</td>
<td>0.01 (0.01, 0.01)</td>
<td>26645</td>
</tr>
<tr>
<td>2005</td>
<td>Ahwaz</td>
<td>0.01 (0.01, 0.01)</td>
<td>25772</td>
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<td>2005</td>
<td>Tabriz</td>
<td>0.01 (-0.00, 0.01)</td>
<td>478</td>
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<td>1995</td>
<td>Kashan</td>
<td>0.01 (0.01, 0.01)</td>
<td>43731</td>
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<tr>
<td>2004</td>
<td>Hamedan</td>
<td>0.01 (0.01, 0.01)</td>
<td>18306</td>
</tr>
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<td>2000</td>
<td>Yazd</td>
<td>0.01 (0.01, 0.01)</td>
<td>4980</td>
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<td>1998</td>
<td>Iran</td>
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<td>2001</td>
<td>Gharvin</td>
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<td>39598</td>
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<td>2003</td>
<td>Mashhad</td>
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<td>310518</td>
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<td>2002</td>
<td>Babol</td>
<td>0.01 (0.01, 0.01)</td>
<td>16576</td>
</tr>
<tr>
<td>2002</td>
<td>Chahabar</td>
<td>0.02 (0.02, 0.03)</td>
<td>5409</td>
</tr>
<tr>
<td>2003</td>
<td>Gorgan</td>
<td>0.03 (0.02, 0.03)</td>
<td>38920</td>
</tr>
<tr>
<td>Overall</td>
<td>1 (squared = 99.9%, p = 0.000)</td>
<td>0.01 (0.01, 0.01)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Weights are from random effects analysis

Fig. 3: Forest plot of studies on prevalence of Hepatitis B in voluntary blood donor, showing two types of population

**Diagnostc methods**: The most and lowest method was used ELISA (27 studies) and combination of PCR-ELISA (1 study), respectively.

**DISCUSSION**

This is the first meta-analysis study of Hepatitis B prevalence in blood donor in Iran. In our analysis, the results showed significant heterogeneity (p<0.00001, I² = 99.9%). Because of conducting various studies in different years, regions and sample sizes.

Nearly 83% the studies we have analyzed are cross-sectional studies with period of one year and are therefore indicative of the point prevalence of the disease, but these studies contain about 8 million of all samples. Fortunately about 17% the studies we have analyzed, i.e., 15.5 million of
Fig. 4: Prevalence of Hepatitis B in voluntary blood donor during 1996-2008 years shows decrease of prevalence of Hepatitis B

Fig. 5: Prevalence of Hepatitis B in blood donor during 1996-2008 years shows 1996-2005 decrease of infection and during 2005-2008 increase of infection while infection is decreasing generally

all samples are cross-sectional studies with period of more than one year and one study with period of 10 years. Therefore these results are a real estimation of Hepatitis B prevalence in blood donor in Iran. Overall, the rate of prevalence of Hepatitis B in blood donors from 1996-2008 was decreased [0.7%(CI 95: 0.5-0.8%)] (R= -79%), former studies Hepatitis B infection prevalence in blood donors has been reported 0.8% and less than public population (1.7%) in during 2002-2008 in Fars province, Hepatitis B infection prevalence in blood donors from 0.0049 to 0.0037 was decreased (Kasraian and Jahromi, 2007; Kasraian et al., 2012). In others studies in Bushehr province during 2005-2006, prevalence in blood donors from 0.0036 to 0.0028 was decreased (Esmaeili et al., 2007; Esmaeili et al., 2009b). In Ghazvin province, during 2001-2002, prevalence in blood donors from 0.0108 to 0.0045 was decreased (Vahid et al., 2005; Bozorgi et al., 2006). In Gilan-Mazandaran-Golestan-Semnan provinces prevalence in blood donors is higher than mean
Fig. 3: Hepatitis B prevalence in blood donors in all parts of Iran from 1996 to 2008

of country (0.7%), this similar with prevalence Hepatitis B infection in public population of these regions. In 1979 Farzadegan, the prevalence of Hepatitis B surface antigen (HBsAg) in Iran was reported between 0.5 and 7.2% (Farzadegan et al., 1979; Ghadir et al., 2012). Almost 3% of the Iran population was affected. In the 1980s, divergent from a prevalence rate of 1.7% in the Fars province to 5% in Sistan-Baluchestan province (Ghadir et al., 2012). Results of this meta-analysis indicated 87 and 13% of blood donor are male and female, respectively. According to world health organization, serological survey of free blood donor who gives their blood for the first time is a good indicator for investigating Hepatitis B infection prevalence in adults. While infection prevalence in repeated donors and those who give their blood instead of fee/payment, is more than public population. Serological survey of blood donor which has been done in Iran is not a good indicator for studying Hepatitis B infection prevalence in adults, for numbers of blood donors are male (83%, in this study). Accordingly, blood donors can not be a representative of general adults’ population. Second, in the most studies, serological findings related to the first time blood donors were not separated from repeated blood donors while just 35 to 84% of blood donors did not mention their giving blood backgrounds. In fact, anyone can give his blood repeated provided that he/she
doesn't have any infection. Results of this meta-analysis indicated 90% studies used ELISA for
detection of HBs antigen as diagnostic method, therefore in screening of blood donors in early of
acute phase of Hepatitis B don't have HBs antigen can't be diagnosed. In addition to the risk
of transmission through the transfusion of infected blood, reactivation of Hepatitis B in Occult
Hepatitis B infection (OBI) patients and recipients of their blood can lead to cirrhosis, hepatic
cancer and reactivation of viral replication in the carrier (Kaviani et al., 2008). Therefore, effective
assays to assess and screen for OBI in blood donors are of paramount importance and require
urgent attention.

In general, this reduction of Hepatitis B infection prevalence blood donors in Iran can be due
to, national vaccination of Hepatitis B, screening of blood before transfusion, awareness of public
population and education.

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