Epidemiology of Hepatitis B in Iran

Khashayar Hesamizadeh

Iran Hepatitis Network (IHN)

Middle East Liver Disease (MELD)

On day Scientific Conference on Liver Disease in Pregnancy

26 May 2016, Spinas Hotel
Hepatitis B virus (HBV) belongs to hepadnaviridae family.

- It has a circular DNA genome of 3.2 kb.
- Enveloped DNA virus (DNA polymerase with reverse transcriptase activity) Has affinity for liver and hepatocytes.
- 50 to 100 times more infective than HIV.
- Human beings are the only reservoir.
- Currently, 10 genotypes (A–J) of HBV are identified.
**INTRODUCTION**

✓ **Hepatitis B** initially called as serum hepatitis is a major global public health problem with major pathology in liver.

✓ Infected people with HBV are at increased risk of developing HBV-related liver diseases, including *hepatic cirrhosis* and *hepatocellular carcinoma*.

✓ HBV infection is the 10th leading cause of death and HBV related hepatocellular carcinoma (HCC) is the 5th most frequent cancer worldwide.
HBV Infection

- 2 billion people have been affected
- 350 million people are chronically infected (75% are Asians)
- 10-30 million will become infected each year
- An estimated 600000-1000000 die each year from HBV and its complications
- Approximately 2 people die each minute from hepatitis B

Source: (WHO, hepb.org)
The prevalence of HBV infection varies widely, with rates ranging from 0.1% to 20% in different parts of the world.

Most of the world’s population live in areas where there are high levels of infection.
Global Patterns of Chronic HBV Infection

✓ **High** (>8%): 45% of global population
  - lifetime risk of infection >60%
  - early childhood infections common

✓ **Intermediate** (2%-7%): 43% of global population
  - lifetime risk of infection 20%-60%
  - infections occur in all age groups

✓ **Low** (<2%): 12% of global population
  - lifetime risk of infection <20%
  - most infections occur in adult risk groups

❖ **Low-intermediate-prevalence**: 2% - 4.99%
❖ **High-intermediate-prevalence**: 5% - 7.99%
Geographic Distribution of Chronic HBV Infection

HBsAg Prevalence
- Red: ≥8% - High
- Yellow: 2-7% - Intermediate
- Green: <2% - Low
Epidemiology of Hepatitis B in General Population of Iran

- National Studies in Iran*:
  - In 1991: 1.7%
  - In 1999: 1.7%
  - The overall seropositivity rate showed no significant decline between 1991 and 1999 (before and after mass vaccination) but in the age group 2–14 years the rates reduced significantly (1.3% versus 0.8%, P < 0.05)

- Systematic Review/Meta-Analysis:
  - Alavian, 2008: covering 14 studies from 2001 to 2007, 7 provinces, 2.14% (95% CI: 1.9% - 2.3%)
  - Poorolajal, 2009: covering six studies from 1998 to 2005, 3 provinces, 2.7% (95% CI: 2.2% - 3.1%)
  - Salehi Vaziri, 2016: covering 20 studies from 1993 to 2016, 14 provinces


# Systematic Review & Meta-Analysis

## “An Updated HBV infection in General Population of Iran”, 2016

### Table 1. Estimations of the Prevalence of HBV Infection in the General Population of Iran and its Provinces

<table>
<thead>
<tr>
<th>Province</th>
<th>Study's first author (year of publication)</th>
<th>Year of Study</th>
<th>Total No.</th>
<th>Male No.</th>
<th>HBV Prevalence estimates % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charmahal and Bakhtiari</td>
<td>Moezzi (2014)</td>
<td>2012-2013</td>
<td>3000</td>
<td>1111</td>
<td>13 (0.9 - 1.7)</td>
</tr>
<tr>
<td>East Azarbaijan</td>
<td>Bayat-Makou (2003)</td>
<td>2000</td>
<td>381</td>
<td>ND</td>
<td>1.2 (0.1 - 2.3)</td>
</tr>
<tr>
<td>Golestan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 1</td>
<td>Pourshams (2004)</td>
<td>2003</td>
<td>1035</td>
<td>438</td>
<td>4.3 (3 - 5.5)</td>
</tr>
<tr>
<td>Study 2</td>
<td>Roshandel (2007)</td>
<td>2004-2005</td>
<td>1850</td>
<td>877</td>
<td>8.9 (7.6 - 10.2)</td>
</tr>
<tr>
<td>Study 3</td>
<td>Merat (2009)</td>
<td>2006</td>
<td>1896</td>
<td>607</td>
<td>5.1 (4.1 - 6.1)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.1 (3.5 - 8.7)</td>
</tr>
<tr>
<td>Hamadan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 1</td>
<td>Amini (1993)</td>
<td>1989</td>
<td>4930</td>
<td>1649</td>
<td>2.5 (2.1 - 2.9)</td>
</tr>
<tr>
<td>Study 2</td>
<td>Alizadeh (2006)</td>
<td>2003</td>
<td>1824</td>
<td>1025</td>
<td>2.3 (1.6 - 3)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.4 (2.1 - 2.8)</td>
</tr>
<tr>
<td>Hormozgan</td>
<td>Merat (2009)</td>
<td>2006</td>
<td>1455</td>
<td>658</td>
<td>2.7 (1.9 - 3.5)</td>
</tr>
<tr>
<td>Isfahan</td>
<td>Nokhodian (2009)</td>
<td>2006</td>
<td>816</td>
<td>388</td>
<td>1.3 (0.5 - 2.1)</td>
</tr>
<tr>
<td>Kermanshah</td>
<td>Alavian (2012)</td>
<td>2010</td>
<td>1979</td>
<td>990</td>
<td>0.7 (0.4 - 1.1)</td>
</tr>
<tr>
<td>Kordestan</td>
<td>Alavian (2012)</td>
<td>2010</td>
<td>1613</td>
<td>548</td>
<td>0.8 (0.4 - 1.2)</td>
</tr>
<tr>
<td>Region</td>
<td>Source</td>
<td>Year(s)</td>
<td>Male</td>
<td>Female</td>
<td>Prevalence</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------</td>
<td>---------</td>
<td>------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Mazandaran</td>
<td>Keyvani (2014)</td>
<td>2008-2011</td>
<td>6146</td>
<td>3472</td>
<td>0.9 (0.7-1.2)</td>
</tr>
<tr>
<td>Qom</td>
<td>Ghadir (2012)</td>
<td>2010</td>
<td>3666</td>
<td>1709</td>
<td>1.3 (0.9-1.7)</td>
</tr>
<tr>
<td>Razavi Khorasan</td>
<td>Farhat (2003)</td>
<td>1998</td>
<td>4528</td>
<td>ND</td>
<td>3.6 (3.1-4.1)</td>
</tr>
<tr>
<td></td>
<td>Fathimoghaddam (2011)</td>
<td>2009</td>
<td>1652</td>
<td>794</td>
<td>1.4 (0.8-2)</td>
</tr>
<tr>
<td></td>
<td>Shakeri (2013)</td>
<td>2010-2011</td>
<td>3198</td>
<td>1021</td>
<td>1 (0.7-1.3)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 (0.4-3.6)</td>
</tr>
<tr>
<td>Sistan and Baluchestan</td>
<td>Shahramian (2009)</td>
<td>2008</td>
<td>458</td>
<td>221</td>
<td>3.5 (1.8-5.2)</td>
</tr>
<tr>
<td></td>
<td>Salehi (2012)</td>
<td>2010</td>
<td>3989</td>
<td>1835</td>
<td>3.4 (2.8-4)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.4 (2.9-3.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern Iran</td>
<td>Abedi (2011)</td>
<td>2008-2009</td>
<td>4087</td>
<td>1292</td>
<td>1.5 (1.1-1.9)</td>
</tr>
<tr>
<td>Tehran</td>
<td>Merat (2009)</td>
<td>2006</td>
<td>2327</td>
<td>968</td>
<td>2.3 (1.7-2.9)</td>
</tr>
<tr>
<td>National</td>
<td>Zali (1996)</td>
<td>1991</td>
<td>39841</td>
<td>ND</td>
<td>1.7 (1.6-1.8)</td>
</tr>
<tr>
<td></td>
<td>Zali (2005)</td>
<td>1999</td>
<td>46631</td>
<td>ND</td>
<td>1.7 (1.6-1.8)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.7 (1.6-1.8)</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.2 (1.9-2.6)</td>
</tr>
</tbody>
</table>

Abbreviation: ND, not determine.

*a* This study was conducted in Golestan, Hormozgan, and Tehran provinces.
The polled estimated prevalence of HBV infection in the general population of Iran from 1990 to 2016 was 2.2% (95% CI: 1.9% - 2.6%)

Kermanshah: lowest

0.7%, (95% CI: 0.4% - 1.1%)

Golestan: highest

8.9%, (95% CI: 7.6% - 10.2%)
HBs-Ag in Iranian Male and Female populations

Males: 3%, (95% CI: 2.2% - 3.8%)

Females: 1.7%, (95% CI: 1.2%-2.3%)
The pooled estimated prevalence of HBV infection in the general population of Iran was:

- **Before 2010:** 2.9%  
  (95% CI: 2.5% - 3.4%)
- **After 2010:** 1.3%  
  (95% CI: 0.9% - 1.7%)
Cumulative Prevalence of HBV Infection in the General Iranian Population According to Time

- The Prevalence after Sensitivity Analysis
After sensitivity analysis, the prevalence of HBV infection in years before 2010 decreased to **2.3%** (95% CI: 2% - 2.7%), and overall estimated prevalence of HBV in the general population changed to **1.8%** (95% CI: 1.6% - 2.1%).
Geographic Distribution of HBV Infection in Iran
In the last decade, HBV prevalence has reduced significantly in Iran

✓ The infantile mass vaccination program started in 1993

✓ Enhancement of people’s awareness regarding HBV risk factors

✓ Vaccination of high-risk people

✓ Improve in medical equipment's and blood safety
According to all data, Iran was classified within the low–intermediate HBV prevalence areas (2- 4.99%), while according to recent data (after 2010), Iran is classified within the low HBV prevalence areas (< 2%).
Thank You!
Hepatitis B Virus
Modes of Transmission

- **Parenteral** – Familial contact, healthcare workers and high-risk occupations, blood transfusion, IVDA, are at increased risk.

- **Perinatal** - Mothers who are positive for HBV tests are much more likely to transmit to their offspring than those who are not.

- **Sexual** - sex workers are particular at risk.
In developing countries:

- perinatal (from mother to baby at birth)
- early childhood infections (inapparent infection through close interpersonal contact with infected household contacts)
- unsafe injection practices
- unsafe blood transfusions
- unprotected sexual contact
- I.V. drug use
In developed countries

-patterns of transmission are different from those in developing countries

- Majority of infections in developed countries are transmitted during young adulthood by
  - unsafe sexual practices
  - I.V. drug use

-The virus is not spread by contaminated food or water, and cannot be spread casually in the workplace.
According to WHO:

- Risk of transmission ranges from 10% in 1st trimester to about 90% in 3rd trimester
- If a pregnant woman tests positive for hepatitis B, the newborn must be given - the 1st dose of hepatitis B vaccine and one dose of hepatitis B immune globulin (HBIG)
- Given within 12 hours of life, a newborn has 95% chance of being protected against a lifelong hepatitis B infection
- If not given in time -> 90% possibility that the baby will become chronically infected