

The changing epidemiology of hepatitis B in Iran

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Hepatitis B is one of the most prevalent infectious diseases with 2 billion people infected worldwide, and 350 million chronic HBV carriers. At least one million chronically infected persons die annually of HBV-related complications, namely cirrhosis and hepatocellular carcinoma (1, 2), despite the availability of an effective vaccine (3). The prevalence of HBV carriers varies from 0.1 percent to 2 percent in low prevalence areas (United States and Canada, Western Europe, Australia and New Zealand), to 3 to 5 percent in intermediate prevalence areas (Mediterranean countries, Japan, Central Asia, Middle East, and Latin and South America), to 10 to 20 percent in high prevalence areas (southeast Asia, China, sub-Saharan Africa) (3-7).

The prevalence of chronic carrier state in Iran had been reported to be 3% in 1980s (8). It is estimated that over 35% of Iranian have been exposed to the HBV and about 3% were chronic carriers (8). The wide range in HBV carrier rate in different parts of the world is largely related to differences in the age at infection, which is inversely related to the risk of chronicity. The rate of progression from acute to chronic HBV infection is approximately 90 percent for perinatally acquired infection, 20 to 50 percent for infections between the age of 1 and 5 years,

and less than 5 percent for adult acquired infection (3-4).

Given the high prevalence of HBV, national measures were taken to restrict the spreading of the disease including: national vaccination program since 1993 for all neonates, vaccination of high risk groups such as healthcare workers and the introduction of disposable syringes for use in vaccinations, hospitals and clinics.

Two seroepidemiologic surveys were conducted before and after mass vaccination on a representative sample of 1/1000 of the population of Iran. The overall seropositivity rate showed significant decline between 1991 and 1999 in the age group 2-14 years (1.3% versus 0.8%, $P < 0.05$) (9). According to this study, the overall prevalence of HBsAg declined within 6 years of implementation of hepatitis B vaccination program of neonates from 1993, which is believed to be mainly due to the effect of vaccination of subjects born after 1993. However, despite the decline in the prevalence of HBsAg in general population, hepatitis B remains an important cause of morbidity and mortality in adults most of whom had not received hepatitis B vaccine.

In other words, universal vaccination of Iranian neonates has significantly decreased the carrier rate among young children and the average age of the infected individuals has increased. The epidemiology of infection is also changing from a vertical to horizontal route. In a Cohort study (Nov 2001-Dec 2003) with historical controls, the prevalence of HBV

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infection increased after the age of 16 years old (10).

Recent studies point out that horizontal transmission is the most important route of transmission in Iran. A population-based study in an intermediate prevalence area of Iran showed that history of surgery, imprisonment and older age had the greatest risk for HBsAg positivity (11). Evaluation of blood donors in different areas of Iran revealed that the most common risk factors for the occurrence of hepatitis B were family history of positive HBsAg, close contact with an HBV infected person, history of blood transfusion, male gender, history of hospitalization, history of unsafe sex, history of sexually transmitted diseases, and living in city areas. (12, 13).

In a case-control study in 500 chronic hepatitis B subjects, and 434 subjects negative for hepatitis B, the risk factors in chronic hepatitis B were older age, male gender, marital status, history of contact with hepatitis, extramarital sexual activity, IV-drug use, major surgery, experimental dentist visit, and some jobs (police, barber, and driver) (14). A study on 1113 Iranian large vehicle drivers, 5.9% (CI 95%: 4.5–7.3%) were HBsAg carrier that was different from the prevalence in the general population (1.7%) (15). In a study concerning 226 gypsies from Shahr-e-Kord, Southwest of Iran with a mean age of 20.7 years, 35 subjects (18%) were HBsAg positive. It is noted that tattooing and cupping are common practices among our gypsies. (16) Among 1500 subjects who attended the laboratory for sexually transmitted diseases in the Northeast of Iran between 1998 and 2000, the seroprevalence of HBsAg was 10% in women and 14.2% in men (17).

It is generally implied from previous studies that hepatitis B is more prevalent in selective populations with certain risky behaviors. Unsafe sex, injection drug use, prisoners, drivers and unsterile procedures such as tattooing and cupping have been considered by these studies as the main mechanisms of horizontal transmission of hepatitis B in high-

risk populations. Therefore, apart from national vaccination programs, measures should be taken to focus on the prevention programs for determining the high risk populations and the elimination of high risk behaviors.

Comments

Prisons and interstate drivers are recognized as important sources for the transmission of blood-borne viruses, such as hepatitis B in Iran. Also prisons have been evaluated as HBV sources worldwide (18), because of frequent injection drug use with shared equipments, unsafe sexual activity, mainly between men, despite of thorough supervision. Review of different studies revealed that in people not previously exposed to hepatitis B, vaccination has unclear effect on the risk of developing infection, as compared to no vaccination. The risk of lacking the protective antibody levels as well as serious and non-serious adverse events seems to be comparable among recipients and non-recipients of hepatitis B vaccine. (19). So, It is recommended that prisoners to have feasible availability to condoms, needles and syringes in prisons.

For decades, healthcare workers have been known to be at risk of acquiring a variety of blood borne infections as a result of occupational exposure. Primary prevention of exposure, as recommended by universal precautions guidelines, remains the cornerstone of protecting healthcare workers. Nonetheless, a substantial number of parenteral exposures continue to occur. According to occupational safety and health administration OSHA, the only criterion for applying the standard is the likelihood of exposure to blood and other potentially infectious materials (OPIMs). Thus, the standard is designed to protect all vulnerable personnel, from the clinical engineers who service contaminated equipment to the staff in clinical laboratories, patient care or treatment areas, and housekeeping and laundry services--any location where the nature of the work poses the

risk of exposure to blood borne pathogens. The standard is aimed at protecting employees from occupational exposure to all blood borne pathogens and, especially, to the human immunodeficiency virus (HIV) and the hepatitis B virus (HBV). (20) Vaccines, effective infection control procedures, safer procedures, and safer devices will all be necessary, along with a better understanding of factors that influence healthcare worker behaviors that result in injury. In addition, a number of issues relating to the post exposure management of occupational exposures with blood borne pathogens need to be better understood (21).

Routine traditional procedures like tattooing and cupping, which are of interest of so many people, have been proved to play an important role in horizontal transmission of HBV in Iran, because they are performed in an unsterile fashion and by unauthorized personnel. Measures should be taken to increase the awareness of general population about the awaiting hazards with these procedures, and authorized facilities should be provided to preserve the safety of these procedures.

A large body of evidence advocates the important role of unsafe sex in transmission of HBV in Iran especially in young and interstate drivers. Given the overall young age of Iranian population, youngsters are the largest vulnerability of our society in this regard, and also numbers of drivers are at risk for affecting HBV. On the other hand, due to the cultural characteristics of Iranian society, educational programs in terms of sexual issues fail to be implemented or are undertaken on very small scales. It is inferred from previous studies that educational programs regarding the safety of sexual behaviors should be reconsidered thoroughly.

Fortunately in Iran, there is a good healthcare infrastructure for vaccination program. The long term objective of a hepatitis B vaccination program is to prevent virus transmission in all age groups (newborns, children, adolescents, and at-risk adults), with the ultimate aim of

eliminating the infection, and hopefully in the long-term, eradicating the virus. It is noteworthy that hepatitis B is a preventable problem. Moreover, in addition to vaccination of selected groups, we should take into account some strategies and other effective measures to reduce incidence of hepatitis B, since the epidemiology of HBV in Iran is changing. These strategies include expansion of educational programs, especially in the at risk groups, granting harm reduction establishments to reduce the HBV transmission in IDUs and sex workers; prisoners and drivers. Also introducing new guidelines and regulations for high-risk professions, with the expansion of vaccination program to cover the new at risk people are among the effective measures to be considered.

REFERENCES

1. Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. *J Viral Hepat* 2004;11: 97-107.
2. Lee WM. Hepatitis B virus infection. *N Engl J Med* 1997;337:1733-1745.
3. Maynard, JE. Hepatitis B: Global importance and need for control. *Vaccine* 1990; 8(Suppl):S18.
4. Alter MJ, Hadler SC, Margolis HS, Alexander WJ, Hu PV, Judson FN, et al. The changing epidemiology of hepatitis B in the United States. Need for alternative vaccination strategies. *JAMA* 1990; 263:1218.
5. Stevens, CE, Beasley, RP, Tsui, J, Lee W-C. Vertical transmission of hepatitis B antigen in Taiwan. *N Engl J Med* 1975; 292:771.
6. Tassopoulos, NC, Papaevangelou, GJ, Sjogren, MH, Roumeliotou-Karayannis A, Gerin JL, Purcell R H. Natural history of acute hepatitis B surface antigen-positive hepatitis in Greek adults. *Gastroenterology* 1987;92:1844-50.
7. Wasley, A, Grydal, S, Gallagher, K. Surveillance for acute viral hepatitis--United States, 2006. *MMWR Surveill Summ* 2008; 57:1.
8. Farzadegan H, Shamszad M, Noori-Arya K. Epidemiology of viral hepatitis among Iranian population a viral marker study. *Ann Acad Med Singapore* 1980; 9: 144-48.

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9. Zali MR, Mohammad K, Noorbala AA, Noorimayer B, Shahraz S. Rate of hepatitis B seropositivity following mass vaccination in the Islamic Republic of Iran. *East Mediterr Health J* 2005; 11: 62-67.
10. Kabir A, Alavian SM, Ahanchi N, Malekzadeh R. Combined passive and active immunoprophylaxis for preventing perinatal transmission of the hepatitis B virus in infants born to HBsAg positive mothers in comparison with vaccine alone. *Hepatology Res* 2006; 36: 265-71.
11. Alizadeh AHM, Ranjbar M, Ansari S, MirArab A, Alavian SM, Mohammad K, Adibi P, Sadri GhH, Keramat F, Ardalan A, Arabi M, Gharekhani S, Ataei A, Amraei GhR, Hosseinzadeh M, Hatami S, Zali MR. Seroprevalence of hepatitis B in Nahavand, Islamic Republic of Iran *Eastern Mediterranean Health Journal*, Vol. 12, No. 5, 2006.
12. Alavian SM, Mostajabi P, Malekzadeh R, Azimi K, Vosoogh H, Sarrafi M, et al. Evaluation of Hepatitis B Transmission Risk Factors in Tehran Blood Donors. *Govareh* 2004; 9:169-75.
13. Vahid T, Alavian SM, Kabir A, Kafaei J, Yektaparast B. Hepatitis B Prevalence and Risk Factors in Blood Donors in Ghazvin, IR.Iran. *Hep Mon* 2005; 5: 117-22.
14. Sali S, Bashtar R, Alavian SM. Risk Factors in Chronic Hepatitis B Infection: A Case-control Study. *Hep Mon* 2005; 5: 109-15.
15. Jahani MR, Motevalian SA, Mahmoodi M. Hepatitis B carriers in large vehicle drivers of Iran. *Vaccine* 2003; 21: 1948-1951.
16. Hosseini Asl SK, Avijgan M, Mohamadnejad M. High prevalence of HBV, HCV, and HIV infections in Gypsy population residing in Shahr-E-Kord. *Arch Iran Med* 2004; 7: 20 - 22.
17. Ghanaat J, Sadeghian A, Ghazvini K, Nassiri MR. Prevalence and risk factors for hepatitis B virus infections among STD patients in northeast region of Iran. *Med Sci Monit* 2003; 9: CR91-94.
18. Hellard ME, Aitken CK. HIV in prison: what are the risks and what can be done? *Sex Health*. 2004;1(2):107-13.
19. Mathew JL, El Dib R, Mathew PJ, Boxall EH, Brok J. Hepatitis B immunisation in persons not previously exposed to hepatitis B or with unknown exposure status. *Cochrane Database Syst Rev*. 2008 Jul 16;(3):CD006481.
20. No authors listed. OSHA's bloodborne pathogens standard: analysis and recommendations. *Health Devices*. 1993 Feb;22(2):35-92.
21. Beekmann SE, Henderson DK. Protection of healthcare workers from bloodborne pathogens. *Curr Opin Infect Dis*. 2005 Aug;18(4):331-6.