Epidemiological study on prevalence of Hepatitis B virus among Baghdad population in 2007

Areej Atiyah Hussein
College of Medicine/University of Diyala

Abstract

This study aimed to known the epidemiology, prevalence rate of infection with Hepatitis B virus(HBV)and relationship with sex in Baghdad Governorate in 2007.

A field survey had been carried out to investigate of infection in patients of central public Health Laboratory (CPHL),held from January-2007 to December-2007.blood sample were examined 1350, (650) from females and (700) from males of different years of age. Each specimen was examined and identified by serological test.

The results of Enzyme Linked Immunosorbent Assay (ELISA) test revealed that prevalence rate was (7.33%).

By using infected patient serum (99).there was significant statistical difference (P>0.05) between females and males.

دراسة وبائية عن انتشار التهاب الكبد الفيروسي النمط ب بين سكان محافظة بغداد للعام٢٠٠٧

اريج عطية حسين كلية الطب

الخلاصة

تهدف الدراسة الحالية إلى معرفة وبائية التهاب الكبد الفيروسي النمط ب ونسبة انتشاره وعلاقة مع الجنس للعام٢٠٠٧ في محافظة بغداد إذ اجري مسح ميداني للتحري عن الفيروس في المراجعين الوافدين إلى مختبر الصحة العامة المركزي وللمدة من (كانون الثاني-٢٠٠٧) وللغاية(كانون الأول-٢٠٠٧)تم خلالها فحص١٣٥٠ أنموذج دم ،(٦٥٠)أنموذج من الإناث ،(٧٠٠)أنموذج من الذكور وبفئات عمرية مختلفة،إذ اجري فحص وتشخيص العينات باستخدام الطرق المصلية.أوضحت نتائج اختبار الخميرة للامتزاز المناعي باستخدام مصل الأشخاص المصابين بالتهاب الكبد الفيروسي النمط ب نسبة بلغت(٧.٣٣)كما أوضحت الدراسة بوجود فروق معنوية بين الذكور و الإناث .

Introduction

Hepatitis B is one of the most widespread infections in humans and the commonest cause of world wide liver disease in general the prevalence is low in cold developed countries and high in hot developed countries [1]. It is a DNA virus and one of many unrelated viruses that cause viral hepatitis. The disease was originally known as "serum hepatitis"[2]

The three main mode of transmission are via blood ,during sexual intercourse and parentally from mother to new born (during birth, breast feeding)the observation that needle-stick injuries can transmit the virus indicates that only very small amounts of blood are necessary HBV infection is especially prevalent in addicts who use intravenous drugs[3]

Hepatitis B virus infection may either be acute (self-limiting) or chronic (long-standing). Persons with self-limiting infection clear the infection spontaneously within weeks to months. Acute infection with hepatitis B virus is associated with acute viral hepatitis - an illness that begins with general ill-health, loss of appetite, nausea, vomiting, body aches, mild fever, dark urine, and then progresses to development of jaundice**.** It has been noted that itchy skin has been an indication as a possible symptom of all hepatitis virus types. The illness lasts for a few weeks and then gradually improves in most affected people. A few patients may have more severe liver disease (fulminant hepatic failure) and may die as a result of it. The infection may be entirely asymptomatic and may go unrecognized. Chronic infection with Hepatitis B virus may be either asymptomatic or may be associated with a chronic inflammation of the liver (chronic hepatitis), leading to cirrhosis over a period of several years. This type of infection dramatically increases the incidence of hepatocellular carcinoma (liver cancer). Chronic carriers are encouraged to avoid consuming alcohol as it increases their risk for cirrhosis and liver cancer. Hepatitis D infection can only occur with a concomitant infection with Hepatitis B virus because the Hepatitis D virus uses the

Hepatitis B virus surface antigen to form a capsid [4] Co-infection with hepatitis D increases the risk of liver cirrhosis and liver cancer [5]

In low prevalence areas such as the continental United States and Western Europe, where less than 2% of the population is chronically infected, injection drug abuse and unprotected sex are the primary methods, although other factors may be important [6]. In moderate prevalence areas, which include Eastern Europe, Russia, and Japan, where 2-7% of the population is chronically infected, the disease is predominantly spread among children. In high prevalence areas such as China and South East Asia, transmission during childbirth is most common, although in other areas of high endemicity such as Africa; transmission during childhood is a significant factor [7]. The prevalence of chronic HBV infection in areas of high endemicity is at least 8%.

The major risk factors are male homosexuality, low socio-economic status, intravenous drug abuse, ethnic group, sexual promiscuity, residence in instituations,mental handicap and employment in health professions[8].

Electron microscopy of serum infected with Hepatitis B reveals three types of particle spheres, filaments and virions(Dana particles) HB_SAg is found on the surface of all three types of particle a second antigen is associated with the core (HB_CAg) ,while a third called hepatitis Be antigen (HB_eAg)is located within the core of the virus particle[1].

The virus is divided into four major serotypes (adr, adw, ayr, ayw) based on antigenic epitopes present on its envelope proteins, and into eight genotypes (A-H) according to overall nucleotide sequence variation of the genome. The genotypes have a distinct geographical distribution and are used in tracing the evolution and transmission of the virus. Differences between genotypes affect the disease severity, course and likelihood of complications, and response to treatment and possibly vaccination [9][10].

The assays for detection of hepatitis B virus infection involve serum or blood tests that detect either viral antigens (proteins produced by the virus) or antibodies produced by the host. Interpretation of these assays is complex [11].

Hepatitis B infection does not usually require treatment because most adults clear the infection spontaneously [12]. Early antiviral treatment may only be required in fewer than 1% of patients, whose infection takes a very aggressive course ("fulminant hepatitis") or who are immunocompromised .On the other hand, treatment of chronic infection may be necessary to reduce the risk of cirrhosis and liver cancer. Chronically infected individuals with persistently elevated serum alanine aminotransferase, a marker of liver damage, and HBV DNA levels are candidates for therapy [13].

Although none of the available drugs can clear the infection, they can stop the virus from replicating, and prevent liver damage such as cirrhosis and liver cancer. Treatments include antiviral drugs such as lamivudine, adefovir, entecavir, and immune system modulators such as interferon alpha. However, some individuals are much more likely to respond than others and this might be because of the genotype of the infecting virus or the patient's heredity. The treatment works by reducing the viral load, (the amount of virus particles as measured in the blood), which in turn reduces viral replication in the liver.

Several vaccines have been developed for the prevention of hepatitis B virus infection. These rely on the use of one of the viral envelope proteins (hepatitis B surface antigen or HBsAg). The vaccine was originally prepared from plasma obtained from patients who had long-standing hepatitis B virus infection. However, currently, these are more often made using recombinant DNA technology, though plasma-derived vaccines continue to be used; the two types of vaccines are equally effective and safe [14].

Following vaccination Hepatitis B Surface antigen may be detected in serum for several days; this is known as vaccine antigenaemia [15] .

Materials and Methods

A total number of 1350 individuals were selected randomly which include (650) females and (700) males in different ages admitted to central public Health Laboratory (CPHL) from January-2007 to December-2007. A detailed questionnaire was filled With all necessary information blood sample was drawn by vein puncture using disposable 5 ml syringe, then the blood transferred into plain plastic test tube and left to clot at room temperature, then spun at 3500 rpm using ordinary centrifuge, finally the sera were collect and labeled and stored at $-20C^0$ for subsequent analysis, for the assessment of presence of HB_SAg and anti-HB_CIgM.

Enzyme Linked Immunosorbent Assay (ELISA) used for the detection of Hepatitis B surface antigen (HB_SAg) and anti-HB_C IgM.

Result

Out of 1350 samples,99(7.33%)were found to be positive to hepatitis B virus. the prevalence rate was(44.4%) among females(44),and 55.5% among males(55). there were Statically significant differences between females and males infections. the highest prevalence rate was found in January,February,June,July and September as shown in Figure(1).

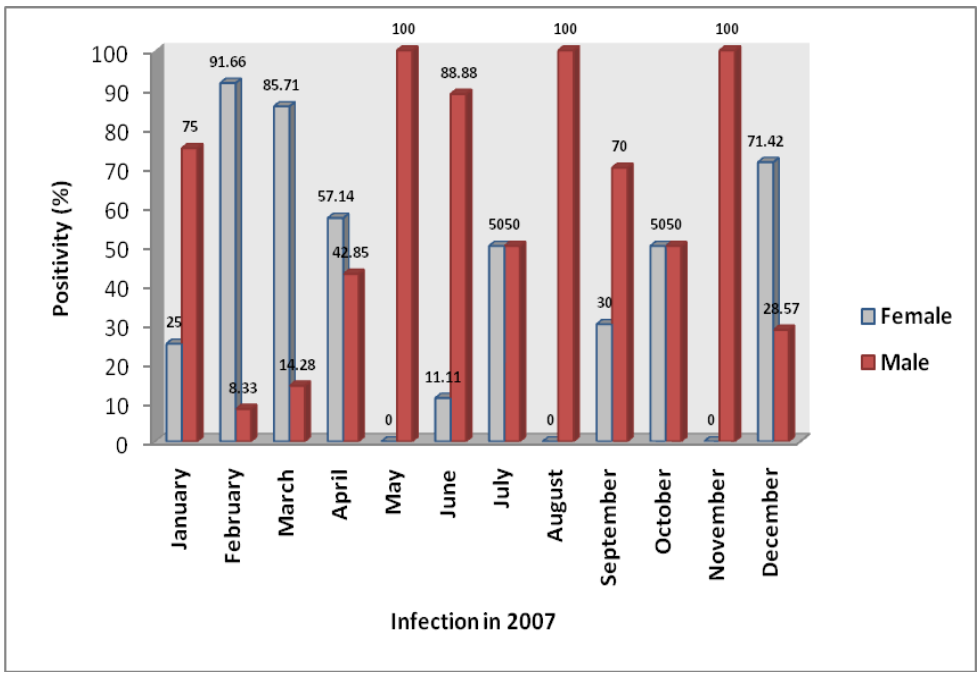

Figure (1):Distribution of Hepatitis B virus among patients with months during 2007

Table (1): Distribution of Hepatitis B virus cases according to the educational level.

Educational level	Number	Percent (%)
Illiterate	25	25.25%
Primary-School	40	40.40%
Secondary-School	19	19.19%
College and above	15	15.15%
Total	99	100%

Table (2): Distribution of Hepatitis B virus cases according to Socio-economic level.

Socio-economic	Number	Percent (%)
Low	60	60.60%
Middle	27	27.27%
High	12	12.12%
Total	99	100%

Table (3): Distribution of Hepatitis B virus cases according to the age.

Age	Male	Female
Children and young (6-12 years)	22(22.2%)	19 (19%)
Adults and elderly (18- 60 years)	33(33.3%)	25(25.2%)
Total	99	100%

Discussion

Our study showed that the prevalence rate of Hepatitis B virus infection in Baghdad in 2007 (7.33%) was much lower than previously reported by [16] and who found that the prevalence rate was 23%.

This difference was due to the identification of hepatitis B infection lack of serological markers; especially Anti-HBcIgM in our study used this marker for identification of Hepatitis B virus infection.

Hepatitis B is a disease with global distribution ,but there are significance differences in it's prevalence between various geographical area and between certain population groups within specific areas .this variation depend on a complex of the behavioural,environmental and host factors [17] there were statistical significant differences(P>0.05)in the prevalence rate of Hepatitis B virus infection between males

and females of the studied samples. this result is in agreement with the result shown by [16]demonstrated higher prevalence rate of HBsAg among healthy men(5.1%)than that of healthy women(3.1%).this was also confirmed by[18] when they demonstrated a higher prevalence rate of HBsAg among male health care personnel(7.6%),than that of female health care personal(2.1%).and [19][20]

The difference in the prevalence rate of HBsAg between both sexes is probably due to a more rapid decline in HBsAg titer in females resulting in a shorter duration of the carrier state [17]

The present study provided evidence that individuals with low educational level (illiterate and primary school) and from low socio-economic standard were more susceptible to the infection than those have high educational level and from high socio-economic standard .Hepatitis B infection occurred mainly in adults and males were effected more than female. it can be concluded from this study and other study Iraq is not a highly endemic country since Hepatitis B infection occurred in the young adult population and at different month of the year.

As a final conclusion we believe that an extended work among this line is of great importance such as increasing the sample size and expanding the work to include as many areas, districts in Baghdad and other governorates in order to reach a better outcome regarding the prevalence rate of this virus among Iraqi population.

Reference.

1-H.Chapel; M.Haeney; S.Misbah; N.Snowden (2007).Essentials of clinical immunology.5th Ed, black well publishing Ltd, Pp: 254-257.
2- Barker LF, Shulman NR, Murray R, *et al* (1996). "Transmission of serum hepatitis. 1970". *JAMA* 276 (10): 841-4.
3-Levinson, Warren and Ernest Jawetz (2004). Medical Microbiology and immunology.9th Ed., McGraw-Hill Companies, Inc., Pp: 293-298.
4- Taylor JM (2006). "Hepatitis delta virus". *Virology* 344 (1): 71–6.

5-Oliveri F, Brunetto MR, Actis GC, Bonino F (1991). Pathobiology of chronic hepatitis virus infection and hepatocellular carcinoma (HCC). *The Italian journal of gastroenterology* 23 (8): 498-502.
6- Redd JT, Baumbach J, Kohn W, *et al.* (2007). Patient to patient transmission of hepatitis B virus associated with oral surgery. *J Infect Dis* 195 (9): 1311-4.
7- Alter MJ (2003). Epidemiology and prevention of hepatitis B. *Semin. Liver Dis.* 23 (1): 39-46.
8-Geoffry Dusheiko (1994).Acute Viral Hepatitis. The Medicine international, Ltd, Pp: 447-453.
9- Kramvis A, Kew M, François G (2005). "Hepatitis B virus genotypes". *Vaccine* 23 (19): 2409-23
10- Magnius LO, Norder H (1995). Subtypes, genotypes and molecular epidemiology of the hepatitis B virus as reflected by sequence variability of the S-gene. *Intervirology* 38 (1-2): 24-34.
11-Bonino F, Chiaberge E, Maran E, Piantino P (1987). Serological markers of HBV infectivity. *Ann. Ist. Super. Sanita* 24 (2): 217-23.
12 Hollinger FB, Lau DT (2006). Hepatitis B: the pathway to recovery through treatment. *Gastroenterol. Clin. North Am.* 35 (4): 895-931.
13- Lai CL, Yuen MF (2007). The natural history and treatment of chronic hepatitis B: a critical evaluation of standard treatment criteria and end points. *Ann. Intern. Med.* 147 (1): 58-61.
14- Zuckerman JN (2006). Vaccination against hepatitis A and B: developments, deployment and delusions. *Curr. Opin. Infect. Dis.* 19 (5): 456-9
15- Martín-Ancel A, Casas ML, Bonet B (2004). Implications of postvaccination hepatitis B surface antigenemia in the management of exposures to body fluids. *Infect Control Hosp Epidemiol* 25 (7): 611-3.
16-Omer A.R. and S.AL-Douri (1984). Viral hepatitis in Iraq, sixth international Cong-Viral.1-7 sept.P:33-6.
17-Deinhardt F. and Gust ID.(1982).viral hepatitis Bull,Wld,.Hlth.Org .,60 :661-690.
18-AL-Alwan A.B.; Omer A.R. and AL-Ani F.S.(1986)Prevalence of hepatitis B surface antigen and anti-HBs it health care personnel in Baghdad. Arab.J. OF Med., 5: 1-6.
19-AL.Mashhadani J.S.(1988). Hepatitis B virus marker in diabetice.MSC thesis Collage of Medicine. Baghdad University.
20-Selma Hadi Mowazi (1993). Epidemiology of Hepatitis B infection in Baghdad Governorate. professional Diploma in Community Collage of Medicine, Baghdad Uni