Prevalence of Hepatitis B surface Antigen in Pregnant Women

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Abstract

Background:

Hepatitis is mostly caused by virus. HBV is the etiological mean of acute (AHB) and chronic hepatitis B (CHB) in people. HBV invade and expand generally in hepatocytes (liver cells). The high risk of infection and death throughout pregnancy has been the thought of pregnancy as an immune-suppressed situation.

Objective:

To find out the prevalence of Hepatitis B surface Antigen (HBsAg) among pregnant women referred to Government Teaching Hospital Shahdara (G.T.H.S) from September 2018 to March 2019

Methods:

This descriptive study was carried out on 1004 pregnant women, hospitalized in G.T.H.S. 5 ml blood was taken from each patient in clotted vial and after separation of serum; HBsAg was examined by the simple screening (ICT) device method and also by ELISA method by using ichroma™ instrument.

Results:

From 1004 pregnant women only 126 (13%) pregnant women were HBsAg positive and 878 (87%) pregnant women were HBsAg negative. Age group 26-30 years showed highest prevalence of HBsAg and age group 15-20 years and 40-45 years pregnant women had lowest prevalence of HBsAg

Conclusions:

In this study, 13% of pregnant women were HBsAg positive, which was slightly higher than the previous studies. Ministry of health should need to reduce the prevalence of HBsAg in pregnant women and make sure the early screening of HBsAg and make sure the vaccination of newborn babies which are infected with HBsAg.

Keywords:

Hepatitis B, HbsAg, pregnant women, chronic hepatitis B, acute hepatitis B.

Introduction:

"Hepatitis" signifies liver inflammation. Liver is an important organ of human body that processes different nutrients, helps in blood filtration, and fights against infections. When the liver is aggravated or harmed, its working can be influenced. Overwhelming use of alcohol, medicines, toxins and certain ailments can cause hepatitis.[1] Hepatitis was at first described improperly as infectious jaundice in 1865, which was later corrected and termed as hepatic inflammation in 1930s.[2] Baruch Blumberg saw that an immunoprecipitation reaction occurs when patient's serum mixed with that of a person of native origin. The previously named Australia antigen denoted the start of the process of disclosure of HBV.[2-4] Krugman and other researchers recognized two types of hepatitis, named MS1 and MS2 in 1967. Normally MS1 hepatitis was taken via mouth after a short incubation period, while MS2 was apparently transferred by intramuscular or intravenous injection with a long incubation period. MS1 and MS2 hepatitis were consequently named hepatitis A and B, respectively.[4] Serial human's and chimpanzee's tests affirmed that main cause of hepatitis B was Australia antigen; therefore, it was renamed as HBV. In 1970, with the help of electron microscopy Dane and other researchers

visualized various sub viral molecules along with the completely wrapped subatomic particle, which were named Dane molecules.[2,3] HBV is the etiological mean of acute and chronic hepatitis B (CHB) in people.[2] HBV included in the group of hepadnaviruses.[5] HBV genome is a relaxed round, partially double helix DNA of approximately 3.2 kbp.[6,7] HBV invade and expand generally in hepatocytes (liver cells).[2] Around 0.24 billion individuals worldwide have CHB infection, and more than 0.78 million individuals bite the dust every year from acute and chronic hepatitis[8], mostly in sub-Saharan Africa and Asia[9], making HBV disease the tenth main reason of death globally.[10] An ongoing report has revealed high frequency of HBV (12%) among pregnant women in Pakistan.[11] Infections in pregnant women with HBV may be a serious threat for both mother and their children.[12] The method of perinatal transmission of virus included placental spillage and introduction to blood and emissions amid delivery.[9] The high risk of infection and death throughout pregnancy has been the thought of pregnancy as an immune-suppressed situation.[13] There are many immunological changes that happen in the stage of pregnancy[14,15] and the postpartum period which may affect the characteristic history and clinical appearances of chronic HBV infection in these women, including postpartum flares of hepatitis. Pregnant women show immunological tolerance to paternally derived fetal antigens by holding normal humoral immunity and by lowering cell mediated immunity. These progressions happen at the maternal-fetal interface moreover they influence systemic immune responses to inflammation and infection.[14] A decrease in cell interceded immunity might be an outcome of hormonal changes related with pregnancy. Estrogen, prolactin, progesterone, *a*-fetoprotein, Human chorionic gonadotropin, *a*-globulin and corticosteroids have been appeared to have immunosuppressive impacts during in vitro studies.[16] Reduced maternal immune response during pregnancy may partly clarify the fetal survival as an allograft.[17]

Methods:

This was a descriptive study based on the data of pregnant females visiting Government Teaching Hospital Shahdara (G.T.H.S) Lahore, Pakistan from September 2018 to March 2019. A vein puncture technique was used to collect blood sample. Sample collected from 1004 pregnant women age (18-45 years) which came to Government Teaching Hospital Shahdara (G.T.H.S) Lahore. By using aseptic technique, 5 ml blood was taken from each patient in EDTA, Citrate, heparin vial or plain vial and blood sample sent to laboratory. After centrifugation plasma or serum was separated and tested for HBsAg by using the HBsAg Rapid Test Cassette for screening method (lateral flow chromatographic immunochemical assay based on the principle of double antibody-sandwich technique) and ichroma™ HBsAg Elisa Kit (Fluorescence immunoassay based on the principle of sandwich immunodetection method). For ICT screening method, device was removed from the pouch of foil and 1 drop of sample (serum/plasma) was added in the specimen well (S) and 2 drops of buffer or 2-3 drops of serum/plasma (50-80 micro liter) was poured in specimen well (S). Red lines appeared. Result was noted in 15 minutes[18] and for HbsAg Elisa method by using a transfer pipette 75 micro liter of sample (whole blood/serum/plasma) was transferred to the detection buffer tube.75 micro liter of diluent buffer transferred to the detection buffer tube by using transfer pipette. After mixing (10-20 times), 75 micro liter of sample mixture transferred into the sample well on the cartridge. After 12 minutes sample loaded cartridge was scanned. Result noted which displayed on the instruments screen.

Results:

In the form of a cut-off index secondary value is served.

Cut-off index	Result	Note
<=0.90	Negative for HBsAg	No need to additional test
>0.90,<1.0	Intermediate	Need to Retest
>=1.0	Positive for HBsAg	Need to confirmation test

Table 1: Interpretation of Test results

Results:

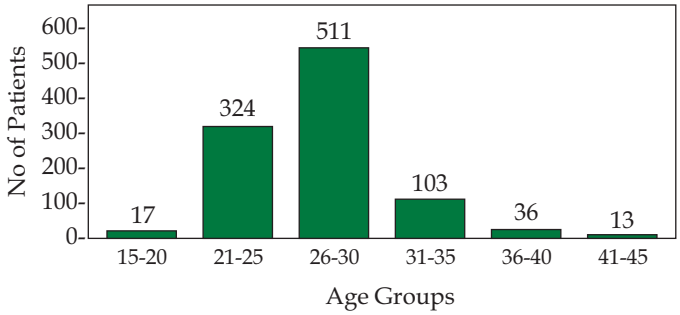

Figure 1: Age wise distribution of study subjects

Figure 1 shows that the participants were divided into 6 age groups. The youngest age group <20 years, contained 17 subjects, age group 21-25 years showed 324 whereas 511 subjects belonged to the age group 26-30 years, 103 participants belonged to the age group 31-35 years, 36 subjects belonged to the age group 36-40 years and the other 13 subjects belonged to the age group 41-45 years as shown in above figure.

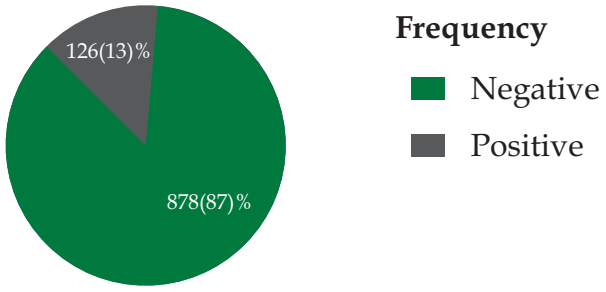

Figure 2: Frequency wise distribution of positive and negative cases

Figure 2 showed that 87% patients are negative for HBsAg and 13% patients are positive for HBsAg.

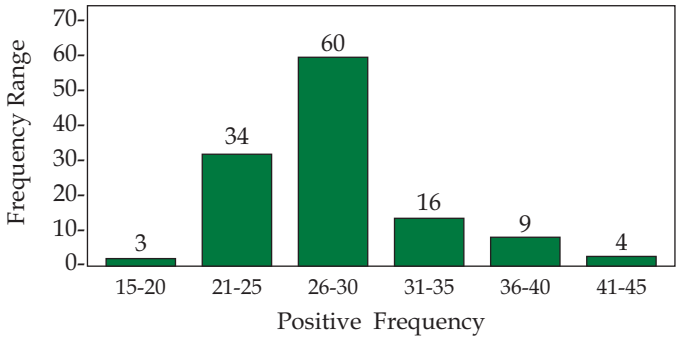

Figure 3: Frequency wise distribution of positive study population

Figure 3 showed that the participants were divided into 6 age groups. The youngest age group <20 years, contained 3 subjects, age group 21-25 years shows 34 subjects whereas 60 subjects belonged to the age group 26-30 years. 16 participants belonged to the age group 31-35 years, 9 subjects belonged to the age group 36-40 years and the other 4 members belonged to age group 41-45 years as shown in figure 3.

Discussion:

International method for the categorization of prevalence of HBV previously described as high (>8%), intermediate (2-7%), and low (<2%) endimicity.[19] In recent study from 1004 patients, 878 pregnant women had been negative for HBsAg while 126 pregnant female were positive for HBsAg. In our study we discovered (13%) prevalence of HBsAg in pregnant women. Our study verify with previous studies. Previous research conducted by Noreen N, Kumar R et al had also mentioned prevalence of HBV (12%) among pregnant women in Pakistan.[20] In this study it was found that most of the patients fell within the 26–30 years age group followed by 21–25 years age group because this was the majority age group admitted to the G.T.H.S. The prevalence of HBsAg (13%) was also similar to the studies of Ugbebor et al.[21] In our study we found higher HBsAg prevalence in the 25-30 years age group and according to the study of Afzali et al., a possible reason for the slightly higher HBsAg prevalence in the 25-30 years old age group is the fact that between these ages, many females are likely to get married and

become pregnant but the prevalence of HBsAg in pregnant women was very low only 1.56% in Iran.[22]

Conclusions:

This study provided the recent information about the prevalence of HBsAg among pregnant women especially around the area of Government Teaching Hospital Shadara, Lahore, Pakistan. In our study we can conclude that prevalence of HBV infection is higher (13%) in pregnant women in Shahdara, Lahore. The age group of 26-30 years showed highest prevalence of HBsAg in pregnant women.

References:

01- Control CfD, Prevention. Hepatitis B: General information. South Carolina State Documents Depository. 2017.

02- Yuen MF, Chen DS, Dusheiko GM, Janssen HLA, Lau DTY, Locarnini SA, et al. Hepatitis B virus infection. Nature reviews Disease primers. 2018; 4: 18035.

03- Suk-Fong Lok A. Hepatitis B: 50 years after the discovery of Australia antigen. Journal of viral hepatitis. 2016; 23(1): 5-14.

04- Block TM, Alter HJ, London WT, Bray M. A historical perspective on the discovery and elucidation of the hepatitis B virus. Antiviral research. 2016; 131: 109-23.

05- Cetin S, Cetin M, Turhan E, Dolapcioglu K. Seroprevalence of hepatitis B surface antigen and associated risk factors among pregnant women. The Journal of Infection in Developing Countries. 2018; 12(10): 904-9.

06- Lok AS, McMahon BJ. Chronic hepatitis B. Hepatology. 2001; 34(6): 1225-41.

07- Tsai K-N, Kuo C-F, Ou J-HJ. Mechanisms of hepatitis B virus persistence. Trends in microbiology. 2018; 26(1): 33-42.

08- Licata A, Ingrassia D, Serruto A, Soresi M, Giannitrapani L, Montalto G, et al. Clinical course and management of acute and chronic viral hepatitis during pregnancy. Journal of viral hepatitis. 2015; 22(6): 515-23.

09- Banks T, Khang J, Watts I, Tyrosvoutis MEG, Min AM, Tun NW, et al. High hepatitis B seroprevalence and risk factors for infection in pregnant women on the Thailand-Myanmar Border. Journal of infection in developing countries. 2016; 10(4).

10- Noubiap JJN, Nansseu JRN, Ndoula ST, Bigna JJR, Jingi AM, Fokom-Domgue J. Prevalence, infectivity and correlates of hepatitis B virus infection among pregnant women in a rural district of the Far North Region of Cameroon. BMC Public Health. 2015; 15(1): 454.

11- Noreen N, Kumar R, Shaikh B. Knowledge about hepatitis B vaccination among women of childbearing age: a cross-sectional study from a rural district of Punjab, Pakistan/Connaissances sur la vaccination contre l'hepatite B chez des femmes en age de procreer: etude transversale dans un district rural du Pendjab (Pakistan). Eastern Mediterranean Health Journal. 2015; 21(2): 129-34.

12- Cui A-M, Cheng X-Y, Shao J-G, Li H-B, Wang X-L, Shen Y, et al. Maternal hepatitis B virus carrier status and pregnancy outcomes: a prospective cohort study. BMC pregnancy and childbirth. 2016; 16(1): 87.

13- Silasi M, Cardenas I, Kwon JY, Racicot K, Aldo P, Mor G. Viral infections during pregnancy. American journal of reproductive immunology. 2015; 73(3): 199-213.

14- Giles M, Visvanathan K, Lewin S, Bowden S,

Locarnini S, Spelman T, et al. Clinical and virological predictors of hepatic flares in pregnant women with chronic hepatitis B. Gut. 2015; 64(11): 1810-5.

15- Nuriel-Ohayon M, Neuman H, Koren O. Microbial changes during pregnancy, birth, and infancy. Frontiers in microbiology. 2016; 7: 1031.

16- Sridama V, Pacini F, Yang S-L, Moawad A, Reilly M, DeGroot LJ. Decreased levels of helper T cells: a possible cause of immunodeficiency in pregnancy. New England Journal of Medicine. 1982; 307(6): 352-6.

17- Lawrence R, Church J, Richards W, Borzy M. Immunological mechanisms in the maintenance of pregnancy. Annals of allergy. 1980; 44(3): 166-73.

18- Blumberg BS, Sutnick A, London W, Millman I. The discovery of Australia antigen and its relation to viral hepatitis. Vitro. 1971; 7: 223.

19- Navabakhsh B, Mehrabi N, Estakhri A, Mohamadnejad M, Poustchi H. Hepatitis B virus infection during pregnancy: transmission and prevention. Middle East journal of digestive diseases. 2011; 3(2): 92.

20- Noreen N, Kumar R, Shaikh BT. Knowledge about hepatitis B vaccination among women of childbearing age: a cross-sectional study from a rural district of Punjab, Pakistan. Eastern Mediterranean health journal. 2015; 21(2).

21- Ugbebor O, Aigbirior M, Osazuwa F, Enabudoso E, Zabayo O. The prevalence of hepatitis B and C viral infections among pregnant women. North American journal of medical sciences. 2011; 3(5): 238.

22- Afzali H, Heravi MM, Moravveji SA, Poorrahnama M. Prevalence of hepatitis B surface antigen in pregnant women in Beheshti hospital of Kashan, Isfahan. Iranian Red Crescent Medical Journal. 2015; 17(7)