

PREVALENCE OF HEPATITIS B INFECTION IN MARRIED WOMEN OF CHILD BEARING AGE IN DISTRICT ISLAMABAD

Najma Javed, Sumera Naz

Pakistan Medical Research Council, Islamabad, Pakistan

ABSTRACT

Background: Mother to infant transmission of hepatitis B virus (HBV) represents a major factor in maintaining chronic infection and depends on the degree of maternal infectivity status. The objective of this study was to determine the seroprevalence of hepatitis B virus surface antibodies (HBsAb) and surface antigen (HBsAg) and e antigen (HBeAg) among married women of child bearing age in district Islamabad.

Material & Methods: It was a cross-sectional, community-based, sero-epidemiological survey. About 3cc blood samples of 277 healthy women of reproductive age group were collected after informed consent. A questionnaire was filled which included information about the socio-demographic parameters, place & mode of birth, hepatitis B vaccination status, HBV vaccination, any household with HBV infection and reasons for not having HBV vaccination. The samples were tested for Hepatitis B surface antibodies and Hepatitis B surface antigens by MEIA "Microparticle Enzyme Immunoassay technique. All HBsAg-positive samples were also tested for HBeAg to see active replicating virus.

Results: Out of 277 samples, 39(14.07%) were found positive for anti HBs. Twenty nine (10.46%) were positive for HBsAg out of which 3(1.08%) were positive for HBeAg. Mean age was 29.81 years (21-42 years).

Conclusions: 14.07% females of district Islamabad were found positive for anti HBs showing past exposure to HBV with recovery and/or immunity. 10.46% women were positive for HBsAg showing exposure to HBV and about 10% women in this HBsAg positive group were also positive for HBeAg showing highly infective stage with active replicating virus where chances of virus transmission to the newborn are almost 90% in pregnant women.

KEY WORDS: Antibodies; Antigens; Transmission; Reproductive age.

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INTRODUCTION

Hepatitis B virus (HBV) infection is an important public health problem worldwide. More than two billion people (one third of the world's population) have been infected with HBV and between 350 and 400 million people have chronic liver infections with the presence of hepatitis B surface antigen (HBsAg).¹⁻³ A range of 25-40% of patients with chronic HBV infection eventually develops the complications of cirrhosis and/ or hepatocellular carcinoma (HCC)⁴. Globally, the prevalence of chronic HBV infection is classified into three groups: high prevalence (> 8%), intermediate prevalence (2%-8%) and low prevalence (<2%).⁵ Pakistan is classified as having intermediate endemicity of hepatitis B virus with 2.5% prevalence.⁶

The first serologic marker of HBV infection is HBsAg, which can be detected from 2 to 12 weeks after infection with HBV. The presence of HBsAg indicates that the person is potentially infectious⁷. HBsAg positive mothers are believed to account not only for mother to child transmission at birth but also for the intra familial horizontal transmission of HBV during infancy and early childhood.⁸ If the mother is HBsAg positive and is also positive for HBeAg (a marker for infectivity) then there is a 90% chance that she will transmit the disease to her newborn. If the mother is HBsAg positive and not HBeAg positive, than the probability goes down to 20-30%.

Children born to HBsAg positive mothers have a significantly higher risk of becoming HBsAg positivity than those born to HBsAg negative mothers.⁹ The prevalence of HBsAg among married women of childbearing age plays a very important role in the transmission and prevalence of HBV. Although some studies have reported the seroprevalence of HBsAg and its related risk factors among the general popula-

Corresponding author:

Dr. Najma javed
Senior Medical Officer
Pakistan Medical Research Council Islamabad
e-mail: javed.najma@gmail.com

tion,¹⁰ blood donors,¹¹ pregnant women¹² and health care workers¹³ in the past few years. Only few studies have focused on married women of childbearing age (15-45 years).

Islamabad is the capital of Pakistan located within the Islamabad Capital Territory. The results of the National Survey on Prevalence of Hepatitis B & C in general population of Pakistan conducted by Pakistan Medical Research Council, Islamabad in 2009 showed that prevalence of HBsAg in district Islamabad was 5.6% which is second higher after Dera Ghazi Khan (5.7%) among 36 districts of Punjab, while prevalence of HBsAg in Punjab was 2.4%. In Punjab the prevalence of and HBeAg among HBsAg positive cases was 10.39%.

The objective of present study was to determine the sero-prevalence of HBsAg, Anti HBs and HBeAg among married women of childbearing age in district Islamabad.

MATERIAL AND METHODS

This community-based, sero-epidemiological survey was conducted in PMRC Islamabad, from December 2008 to May 2009. The sample size was determined by using the 2.5% HBsAg prevalence and 14% HBeAg in HBsAg positive cases, which came to be 250 women. Multi phase sampling technique was used for selection of study site and study population. In first phase Islamabad was divided into urban and rural communities. Six clusters (03 rural and 03 urban) were selected; from Bani gala, Kuri shehr, Gokina village and Bara Kahu, Karachi Company, and I-Sector respectively. As houses were not properly numbered in these communities, therefore we started sampling from the mosque and selected a lane at random from there and then enrolled every 2nd house. If the family did not give consent then the next house was selected. Inclusion criteria were married women residing in District Islamabad having no symptoms & signs of liver disease. Females already suffering from Hepatitis B infection were excluded from the study.

After taking informed consent from the woman or the head of household, a performa was filled which

included information about the socio-demographic variables, like age in years, age groups, residence, number of children, place & mode of deliveries, hepatitis B vaccination status, history of any household with HBV infection. HBsAb, HBsAg, HBeAg positivity were the research variables.

About 3 ml of whole blood was collected from each enrolled subject by a trained phlebotomist and stored in a gel bottle with proper labeling. Blood was transported to a private lab where serum was separated and stored as pairs. The tests included Hepatitis B surface antibodies (anti HBs), Hepatitis B surface antigen (HBsAg) and Hepatitis B e antigen (HBeAg) which were performed on ARCHITECT of Abbott using “Microparticle enzyme Immunoassay” ELISA. Anti HBs & HBsAg were tested on all samples & those that were positive for HBsAg were further checked for HBeAg.

After successfully calibrating the kits both positive and negative control of all three markers i.e. HBsAb, HBsAg, HBeAg were run before running each batch of samples.

Data was entered on excel spread sheet and analyzed.

RESULTS

Mean age of the participants was 29.8 years (21-42 years). Table 1 shows that out of total 277 married females only 38 (13.7%) were positive for HB_sAb indicating either vaccination or previous exposure to the virus (protection). HB_sAg was found in 30 (10.8%) females and three (1.0%) cases also had HB_eAg antigen positive indicating infectious phase and replicating virus.

Figure 1 shows the distribution of HBV serological markers among rural and urban clusters. Very high positivity of HB_sAg was found in two rural clusters that is Banigalla with 19 cases (65.5%) and Village Gokina with 06 cases (20.7%). Three cases of HB_eAg positivity were also found in Banigalla. While in urban Islamabad only one cluster of Sector I showed 5 positive cases for HBsAg. The prevalence HB_sAg was significantly higher among women from rural areas (65.5%) compared to those from urban

Table 1: Frequency of HBV serological markers in different age groups.

Age (Years)	Total number n (%)	HBV serological markers					
		HBsAb		HBsAg		HBeAg	
		(n)	%	(n)	%	(n)	%
15-25 yrs	98 (35.37%)	13	13.26 %	11	11.22 %	Nil	Nil
26-35yrs	143 (51.62%)	21	14.68 %	14	9.79 %	Nil	Nil
36-45yrs	36 (13.01%)	04	11.11 %	05	13.88 %	03	8.33 %
Total	277 (100%)	38	13.71 %	30	10.83 %	03	1.08 %

Table 2: Demographical variables among study population.

S#	Demographical variables	Yes		No	
		n	%	n	%
1	Prior knowledge of HBV vaccine	56	20.21%	221	80.01%
2	Ever been tested for HBV during any of the pregnancy	121	43.68%	156	56.31%
3	HBV positive house hold contact	29	10.46%	248	89.53%
4	History of blood transfusion	19	6.85%	258	93.14%

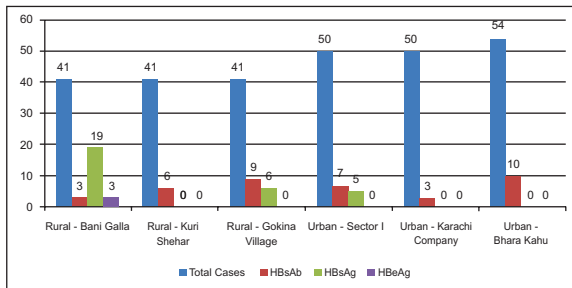


Figure 1: Distribution of HBV serological markers among selected rural and urban clusters of District Islamabad.

areas (4.6%); ($p < 0.001$).

Table 2 shows that out of 277 women interviewed only 56 (20%) had prior knowledge of HBV vaccination and 121 (80%) were tested for HB_sAg mostly as routine/ baseline tests during pregnancy. Twenty nine (10%) women gave history of HBV positive household contacts and 19 (7%) had history of blood transfusion. Data showed that 132 women had history of delivery in government hospitals, 43 in private hospitals and 45 home deliveries. One eighty three had vaginal deliveries and 36 had cesarean section. Frequency of HBV infection among women who delivered their babies vaginally was (32/183) 17.4%, while it is (4/36) 11.1% in those who had the history of cesarean section.

DISCUSSION

In present study 39 (15.4%) mothers had HBsAb while 29 (11.4%) were positive for HB_sAg and three (1.08%) were also HB_eAg positive. Same study from China reported the sero-prevalence level

of HBsAg of 9.51% in childbearing age women in Hainan which is lower than our study.¹⁶

A study by Ahmed et al revealed the frequency of Hepatitis B and Hepatitis C combined amongst urban and rural population as 45% and 55% which is similar to our finding in that frequency is greater in rural than urban population.¹⁷

In present study out of 277 women interviewed, only 56 (20.21%) had prior knowledge of HBV vaccination and 121 (43.68%) were tested for hepatitis B mostly as routine/ baseline tests during pregnancy. Tylor et al in their study found that only 56 % of the respondents reported they had ever heard of HBV infection while 123 (38 %) out of 413 of the women knew they had been serologically tested for hepatitis B. In Another recent study reported that overall 76% of all women had inadequate knowledge about hepatitis B infection, 19.5% had been screened, while 9.7% had been vaccinated against infection.¹⁸

In our study 6.8% women had a positive history of blood transfusion. However Zhang et al revealed that there was no association between HBsAg prevalence and history of dental surgery, history of surgery, transfusion history and endoscopy history.¹⁶

Another study has shown that HBV may occur in households with a persistent carrier probably via saliva or open wounds, although it is less efficient than sexual or perinatal transmission. In our study 29 (10.4%) women had positive HBV contacts at their homes while 89.5 % did not.²⁰

Efforts to increase knowledge about HBV infection in communities at all levels should be done targeting less educated, less well to do clusters and also those with positive contacts. Further, the routine maternal HBsAg screening should be complemented with immunoglobulins injections to positive mothers so as to prevent mother-to-child transmission of HBV.

CONCLUSION

This study shows that the overall HBsAg seroprevalence among married women of District Islamabad is 10.83%, which is alarmingly high as compared to the general population i.e. 5.6%. About 10% cases from HBsAg positive group were also HB_eAg positive showing presence of active replicating virus (Highly infective stage) and if women were pregnant at that time then there would be 90% chances to transmit virus to their newborns.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.
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