Original Article

Intrafamilial Occurrence of Hepatitis B Virus Infection in Family Contacts of HBsAg Positive Subject

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Abstract:

Background: Hepatitis B virus (HBV) infection is the global public health challenge. Family members of the HBV infected patients have a high risk of exposure to many blood-borne diseases including Hepatitis B and Hepatitis C viral infections. Of these Hepatitis B is not only the most transmissible infection, but also the only one (HBV) that is preventable by vaccination. **Objectives:** To assess Occurrence of Hepatitis B Virus Infection in family contacts of HBsAg positive subject **Methods:** A six-month cross sectionalstudy was carried out at the department of Medicine, Comilla Medical College. Ethical approval from the institutional review board was obtained to ensure patient privacy and confidentiality. **Results:** Among 120 selected patients analysis of relatives with the infected patients revelaledthat most were son and daughters. In the study, out of 379 family members 316 (83%) attended the study and 63 (17%) family members were unattended. Among attended family members 37 (11.7%) were known to be positive for HBV, 279 (88.3%) were found negative. Among the study subjects 68 (56.3%) were female and rest 52 (43.8%) were male. Female to male ratio was 1.28:1. Occupation of the study subjects where most were housewives (22.2%) and students (55%). Total 120 index cases,15 (12.5%) cases were found positive family history for HBV, 90 (75%) were found negative and 15 (12.5%) were unaware of their all family members HBsAg status. **Conclusion:** Family members staying same house of the HBV infected patients are at highest risk.Total 15(12.5%) index cases were found positive family for HBV infection. So they should take proper preventive measures.

J Com Med Col Teachers Asso Jan 2024; 28(1): 14-18

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Introduction:

Acute Hepatitis B virus (HBV) infection is a major global health problem. It can cause both acute and chronic hepatitis. Chronic hepatitis can progress to cirrhosis and hepatocellular carcinoma (HCC) leading to death. WHO estimates that in 2015, 257 million people were living with chronic hepatitis B infection (defined as hepatitis B surface antigen positive) resulted in an estimated 887000 deaths, mostly from cirrhosis and hepatocellular carcinoma. According to latest WHO estimates, the proportion of children under five years of age chronically infected with HBV dropped to just under 1% in 2019 down from around 5% in the pre-vaccine era ranging from the 1980s to the early 2000s.[1]The virus is most commonly transmitted from mother to child during birth and delivery, as well as through contact with blood or other body fluids, including sex with an infected partner, injection-drug use that involves sharing needles, syringes, or drug-preparation equipment and needle sticks or exposures to sharp instruments.

Bangladesh, together with the Indian sub-continent is recognized as a country with moderate prevalence of hepatitis B[2]. Beyond this rather surface-level characterization, there remains considerable ambiguity regarding the epidemiology of hepatitis B virus (HBV) infection in the country. Lack of reliable epidemiological

DOI: https://doi.org/10.3329/jcomcta.v28i1.75712

information has been cited as one of the key challenges to effective hepatitis B response in Bangladesh[3]. The study will determine the spread of HBV infection in the families with a member verified as a virus carrier, and to identify the family members with the highest risk of infection. The serologic status of the study subjects concerning infection with HBV was determined by enzyme immunoassays (HBsAg). According to a study from Bosnia by Salkic et al., the prevalence of hepatitis B surface antigen positivity was 12.2% among family members of index cases and in a study by Kim et al the prevalence was 14%, which clearly demonstrated that family members of index cases had a higher rate of HBV infection.[4] Studies by Zervou et al and Thakur et al showed that high rates of prevalence among siblings of index cases were a result of horizontal transmission.[5] Siblings shared the same environment and family habits, which might be associated with increased risks of transmission.

According to Kim et al., the offspring of carriers showed significantly higher risk of HBV infection (relative risk; 6.6). Sharing of towels, handkerchiefs, and vessels were found to be associated with an increased risk of HBV infection via intrafamilial transmission in Korea[4].

A study from Taiwan showed paternal transmission playing a minor role in the intrafamilial spread of hepatitis B virus infection [6]. It has been observed that pre-school children have an HBV carrier rate of between 2 and 3%, which is same rate as recorded among adults[7]. Indian study [8] suggests that most of India's HBV carrier pool is established during early childhood. Hepatitis B virus is reported to be responsible for 50% of the cases of chronic hepatitis and 35-60% of the cases of cirrhosis of liver in India and about 60% of the patients with hepatocellular carcinoma.[9,10]As there was lack of data on the prevalence of HBV infection among close family contacts, we decided to evaluate the prevalence of HBV surface antigen in family members of HBsAg-positive patients. Our goal is to find out HBsAg positive index cases and HBsAg status of that index cases and search for possible risk factor in close family environment.

Methods:

Study Design:

It was a cross sectional descriptive study.

Study place:

Departments of Hepatology, Gastroenterology and Medicine (indoor and outdoor) department of Comilla Medical College Hospital (CuMCH), Cumilla.

Study period: Six month (January 2021 to June 2021)

Sample size:

Sample size determination depends on time and resources. Data were expressed as mean values±sd., median and range or as number of subjects and percentages. As prevalence is known following equation is used.

n = z2 p q / d2

n = sample size

z = level of confidence according to the standard normal distribution (for a level of confidence of 95%, z will be 1.96

p = Estimated proportion of population that presents the characteristic (when unknown we use p =5% (0.05)

d = tolerated margin of error (for example we want to know the real proportion within 4%)

n = (1.96)2 0.05 0.95/(0.04)2

= 0.182476/0.0016

= 114

Total 120 cases were included in the study.

Selection criteria:

Inclusion criteria

- 1st degree family members staying in the same house of the index case

Exclusion criteria:

- Family members not staying in same house of HBsAg positive subject.
- Family contacts with a history of blood transfusion, hemodialysis, drug addiction wereexcluded.
- HBsAg positive index cases those cannot present any of the family members.

Data were collected covering the relevant parameters for the study. All categorical data were expressed in percent and absolute number. All numerical continuous data were expressed in mean ±SD. The data analysis was done using Statistical Packages for the Social Sciences (SPSS) 26. Informed consent was obtained from the patient/patient's relative. Approval of the study, its verification and ethical clearance was obtained from institutional review committee.

DOI: https://doi.org/10.3329/jcomcta.v28i1.75712

Results:

Table I: Attended family members of index cases (n=316)

		Frequency	Percent
	Husband	23	7.2
	Wife	66	20.83
	Sister	41	12.9
	Brother	22	6.8
	Father	44	13.9
	Mother	34	10.73
	Son	48	15.33
	Daughter	38	12.66
	Total	316	100.0

Table II: Gender of the Index cases (n=120)

		Frequency	Percent
	Female	68	56.6
	Male	52	43.3
	Total	120	100.0

Table II showing among the index cases 68 (56.3%) were female and rest 42 (43.8%) were male. Female to male ratio was 1.28:1.

Table Ill: Occupation of the Index cases(n=120)

		Frequency	Percent
	Student	66	55
	Service	21	17.5
	House wife	27	22.2
	Others	6	5.0
	Total	120	100.0

Table Ill showing occupation of the study subjects where most were house wives (22.2%) and students (55%)

Table IV: Level of education of Index cases (n=120)

		Frequency	Percent
	None	3	2.5
	Primary	10	8.3
	Secondary	42	35.0
	Higher secondary	47	39.16
	Graduate	18	15.0
	Total	120	100.0

Table IV showing educational level of study subjects where most were at higher secondary level (39.16%) and next were secondary (35%)

Table V: HBV vaccination status (any family member) of index cases(n=120)

		Frequency	Percent
	Yes	35	28.8
	No	85	71.3
	Total	120	100.0

Table V showing 35 (28.8%)index cases have vaccinated any one of their family members and 85 (75%) were found no family members vaccinated against HBV.

Table VI: Description of family members of index cases(n=379)

	Frequency	Percent
Attended	316	83
Unattended	63	17
Total	379	100.0

Table VII showing 316 (83%) family members attended the study and 63 (17%) family members were unattended.

Table VII: HBV status ofattended family members (n=316)

	Frequency	Percent
Positive	37	11.7
Negative	279	88.3
Total	316	100.0

Table VII showing among attended family members 37 (11.7%) were known to be positive for HBV, 279 (88.3%) were found negative.

Table VIII: HBV infection in family of index cases (n=120)

		Frequency	Percent
	Positive	15	12.5
	Negative	90	75
	Unware	15	12.5
	Total	120	100.0

Table VIII showing 15(12.5%) index cases has positive family for HBV infection, 90 (75%) were found negative and 15 (12.5%) were unaware (incomplete of all family members HBsAg status).

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Discussion:

This study was conducted in a tertiary care hospital in Bangladesh where all first degree family members of HBV infected persons were included in the study and those were are at a greater risk of various blood-borne infections including hepatitis B. Among selected patients all were infected with HBV. In our country there are more HBV infected patients then the HCV infection. According to the World Health Organization (WHO) estimates, hepatitis B vaccination coverage among relatives and health care workers varies from 18% in Africa to 77% in Australia and New Zealand.[11]

Among the study subjects 68 (56.3%) were female and rest 42 (43.8%) were male. Female to male ratio was 1.28:1. Regarding occupation of the study subjects most were housewives and students. Among female in our country most are house wives which is the present scenerioof Bangladesh. Regarding educational level of study subjects where most were at higher secondary level (39.16%) and next were secondary (35%). This present the present educational status of our community.

In our study out of 379 family members 316 (83%) attended the study and 63 (17%) family members were unattended. Among attended family members 37 (11.7%) were found positive for HBV, 279 (88.3%) were found negative.Among 120 index cases, 15 (12.5%) were found positive family for HBV infection, 90 (75%) were found negative and 15 (12.5%) were unaware (not completed all of their status. The proportion of vaccinated among family members were differed. The reason of such differences of vaccination coverage can be explained on the basis of their educational and awareness status. The percentage of vaccinated among the community is much higher, as estimated by WHO in the South-East Asian Region (SEAR). WHO estimated the mean immunization rate people for HBV in SEAR-D region in the absence of data by extrapolating it from the African (AFR)-D region where it was 18% in Nigeria.[11] This can be explained by the fact that very few reliable studies were available on hepatitis B vaccine coverage among the community people of Bangladesh before the above mentioned estimate. Here also, the data is only from a tertiary hospital of Bangladesh. This estimation cannot be representative of the country.

Regarding screening of HBsAg and Anti HCV status of the family members of the infected patients where HBsAg was found positive in 6(5%) cases. A study conducted in Dhaka, Bangladesh by Ashraf et al.[12] found that the HBsAg prevalence of 6.5% among the study population was within the range of 2-7%, as reported by previous studies from selective populations of Dhaka, Bangladesh: 3% among healthy adults and children and 3.5% among pregnant women; however, a much lower rate (0.8%) was observed among schoolchildren. This suggested that the first degree family members of these groups has more chances of being exposed to infectious.

Conclusion:

In our study out of 379 family members 316 (83%) attended the study and 63 (17%) family members were unattended. Among attended family members 37 (11.7%) were positive for HBV infection, 279 (88.3%) were found negative. Total 120 index cases,15 (12.5%) index cases were found positive family for HBV infection, 90 (75%) were found negative and 15 (12.5%) cases were unaware of their all family members HBsAg status. So we can conclude that first degree family members of HBV infected patients are at highest risk. Considering the high possibility of hepatitis B transmission among 1st degree family members, pre-marriage tests, screening of pregnant women, vaccination and training of family members (particularly mothers), pre-marriage consultation for couples one of which is positive for HBsAg, and follow-up HBsAg positive mothers and their infants for receiving prophylactic treatment are important measures to prevent hepatitis B transmission in the community.

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