Familial Transmission In HBV

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Abstract

Introduction: Chronic hepatitis B Virus (HBV) infection is an important cause of cirrhosis of liver for which effective treatment is available but still significant number of patients require liver transplantation when it reaches end stage liver disease. There are various routes of transmission for HBV like parenteral, vertical, nosocomial and through close contact among family members of HBV patient. There are limited studies in literature determining familial prevalence in HBV patient.

Aims and Objectives: To determine prevalence of HBV in family members of HBV patients confirmed on HbsAg and HBV DNA quantitative viral load testing.

Materials & Methods: It was prospective study conducted at Department of Medical Gastroenterology, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak, over a period of three years from 1st June, 2022 to 31st May, 2025 during which 3000 confirmed patients of Chronic hepatitis B reported in department in last three years duration and out of this total pool of 4000 patients, till date 6500 family members of 2100 HBV patients got tested HbsAg and/or HBV DNA quantitative test for ruling out HBV infection. Hence data pertaining to them was used in final analysis.

Results: Out of the 2100 HBV patients, whose 6500 family members were checked for HBV infection, 813 (12.50 %) were found to be HBV positive and 5687 (87.50 %) were HBV negative. If we calculate these 2100 patient family as a whole, then out of them 354 (16.85%) families were having at least one more member, in addition to patient positive for HBV infection and rest 1746 families (83.14%) have no member suffering from HBV infection, other than index patient.

Conclusion: The family members of every Hepatitis B patient should be screened for HBV infection. The positive members should be evaluated in detail for stage of disease and if needed treatment should be started on priority. The members who are found to be HbsAg negative should be vaccinated with complete course of three doses of HBV vaccine.

Introduction

HBV transmission has many routes; most predominant one includes percutaneous or per mucosal exposure to HBV-containing body fluids. The most important source of infection is blood **[1]**. HBV transmission occurs through different kind of human contact, including vertical transmission from mother to newborn, sexual contact, close household contact, needle sharing, and occupational exposure (horizontal transmission) **[2,3]**. HBV is efficiently transmitted by sexual contact **[2].** The main risk factors are unprotected sex with an HBV-infected partner, mainly unvaccinated MSM and heterosexual individuals with multiple sex partners or contact with sex workers **[3].** HBV has a higher prevalence within families due to household transmission. Studies show that family members of individuals with HBV have a significantly increased risk of infection, up to four times greater than in the general population. This increased risk is largely attributed to close contact and various modes of transmission

within the household. The transmission within families occurs through blood, sexual contact, and from mother to child (vertical transmission). Within families, horizontal transmission (e.g., between spouses or children) is also common. The HBV status of the index case significantly impacts transmission within the family. Mothers with HBV have a higher risk of transmitting to their children. Larger families may have a higher risk due to increased potential for close contact. For household contacts, the length of time spent living with an infected individual can affect the risk of transmission. There is higher prevalence in certain regions and among specific populations with limited access to healthcare and preventative measures. Unsafe sex practices and injecting drug use are known risk factors for HBV transmission and can also increase familial spread. Early identification of infected individuals and their family members through screening programs, followed by vaccination, is crucial for preventing further transmission. In India, Hepatitis B is considered a public health problem, with a prevalence rate of 2-4% in the general population. However, the prevalence among household contacts of HBV-positive individuals is significantly higher. Intra-familial transmission is a major factor in maintaining HBV endemicity in India. Studies in India have reported familial transmission rates ranging from 11.9% to 19.2%, much higher than the general population. It is recommended to screen all family members of HBV-positive individuals and provide vaccination to susceptible individuals, especially children, to control transmission. Care providers should take precautions like not sharing items like razorblades, toothbrushes, nail clippers and properly covering open cuts or wounds.

Aims and Objectives

To determine prevalence of HBV in family members of HBV patients confirmed on HbsAg and HBV DNA quantitative viral load testing

Material and Methods

It was prospective study conducted at Department of Medical Gastroenterology, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak, over a period of three years from 1st June, 2022 to 31st May, 2025. During which 3000 confirmed patients of Chronic hepatitis B who reported in department in last three years duration and out of this total pool of 3000 patients, till date 6500 family members of 2100 HBV patients got tested HbsAg and/or HBV DNA quantitative test in their family members for ruling out HBV infection. Hence data pertaining to them was used in final analysis.

Statistical Analysis

All the data was entered in Microsoft Excel and was analysed using SPSS 15.0 version.

Observations & Results

Out of 3000 patients of Chronic hepatitis B who reported in department in last three years duration, till date 6500 family members of 2100 HBV patients got tested HbsAg and/or HBV DNA quantitative test in their family members for ruling out HBV infection. Out of the 2100 HBV patients, whose 6500 family members were checked for HBV infection, 813 (12.50 %) were found to be HBV positive and 5687 (87.50 %) were HBV negative. If we calculate these 2100 patient family as a whole, then out of them 354 (16.85%) families were having at least one more member, in addition to patient positive for HBV infection and rest 1746 families (83.14%) have no member suffering from HBV infection, other than index patient. In this final pool of these 6500 family members of HBV patients, there was male predominance i.e. 4150 (63.84 %) while females were only 2350 (36.16 %). Majority of patients family members belonged to poor socio-economic status and had rural background i.e. 4370 patients (67.23 %).

HBV Patients	Family Members	HBV Positive Members	HBV Negative Members	HBV Positive Families	HBV Negative Families	Rural Area	Urban Area
2100	6500	813 (12.50%)	5687 (87.50%)	354 (16.85%)	1746 (83.14%)	4370 (67.23%)	2130 (32.7%)

TABLE 1- Showing Familial Transmission, Geographical Distribution in HBV Study Group

Discussion

HBV infections is dependent on the country of birth, as in HBV-endemic countries, most HBV transmission occurs perinatally or during childhood. In countries with intermediate and high HBV endemicity, HBV transmission mainly occurs during infancy and early childhood through vertical or horizontal transmission. In one estimate, approximately 90% of infections occur before 10 years of age, leaving many adults immune from infection later in life **[4]**. The prevalence of positive HBsAg in Nahavand was 2.3%. The most frequent relatives of index cases were sons and daughters (32.2% and 23.5% respectively) and 11% of all family members were HBsAg positive **[5].** In another study**,** the prevalence rate of HBsAg, anti-HBs and anti-HBc among household members was 23.3%, 20.4% and 23% respectively. Mothers and children with 47.6% and 17.2% had the highest and lowest rates of HBV infection, respectively. There was a significant difference between mothers and spouses of index case (47.6% and 29.8%) regarding HBsAg positivity **[6].** In a study conducted by Shreyasi etal, the median (IQR) age of index cases and family members was 37 (27 − 48) and 26 (14 − 38) years, respectively. Among the screened family members, 9.23% (n = 100) members were positive for HBsAg. At least one member of the family was affected in 229/361 (63.43%) index cases. Significantly lower percent of household contacts (9.23%, n = 100) were vaccinated against HBV **[7].** In our department due to implementation of Jeevan Rekha Project & National Viral Hepatitis Control Program (NVHCP) through which there is provision of total free treatment including viral load and other routine tests, drugs, endoscopy, fibroscan, indoor admission in wards etc. Moreover, as a well-planned policy, hepatitis B patients are given free consultation and treatment on daily basis without any waiting period. The appointment of dedicated team which included consultant, peer view support, pharmacist and data operator played a vital role in making our model treatment centre as one of the high flow centres in India where on daily basis around thirty- five new and old patients of HBV come for consultation. There is lot of thrust on counselling which includes testing especially of the spouses and family members of HBV patients. This team effort has led to good social bonding with the patients who developed full faith in the treating team. This familial bonding led to overcome the hurdle of illiteracy and rural background in majority of patients who were treated for HBV. Thus, we were able to convince majority of patients for getting tested their family members for HBV infection. The prevalence of 12.5 % of familial transmission as seen in our study is almost in alignment with previous studies **[5]**. In our study group only 16.85% family of HBV patient, had at least one case positive for HBV infection which is much lower than 63%, as shown in other study **[7]**. The familial transmission is very delicate issue among family members especially among spouses of HBV patients and even sometimes has led to hindrance in sexual relations, living together in same house, using of same utensils & bathrooms and rarely even in separation or divorces among couples. We have learnt in last many years by interacting with such couples, there are lots of apprehension and fear in them regarding transmission of HBV by sexual route. Sometimes, it has led to denial of sexual relationship between the couple and even in some cases temporary or permanent separation by way of divorce. The point is that whether there is any loss in advising barrier contraception during HBV treatment. A good bond between the treating team and the HBV patient & their family members is must for relieving all the fears and issues associated with HBV infection. All the HBV patients and their family members are counselled for precautions to be taken at home like use of separate brush, nail cutter, razor, towel, knife by HBV patient. We always motivate and get vaccinated the family members who are found not suffering from HBV infection. A prescence of female staff in treating team is beneficial, as female patient share their problems more comfortably with the same sex member of the treating team. In our team, keeping this in mind we have trained female nursing officers who perform Fibroscan, assist in doing endoscopy and do even psychological counselling of HBV positive females or whose husband are HBV positive. Our pharmacist is also female and not only distribute drugs but also do additional psychotherapy of patients. It is frequently seen that patient and their relatives due to strong fear of HBV infection, repeatedly try to allay their fears by asking same question to different team members, thus, correct and same answers have to be given by all team members, for mental solace of patient and other family members. This Malhotra's Ashi-Angel approach by our team has brought fruitful result which is evidenced by extra-ordinary compliance in our treated patients **[15]**.

Conclusion

The family members of every Hepatitis B patient should be screened for HBV infection. The positive members should be evaluated in detail for stage of disease and if needed treatment should be started on priority. The members who are found to be HbsAg negative should be vaccinated with complete course of three doses of HBV vaccine.

Limitation of Study

In the present study, family members of all HBV patients have not still got tested for HBV infection, hence more screening of family members can partially change the results.

Conflict of Interest

The authors declare that there was no conflict of interest and no funding was taken from any source to conduct this research.

References

1) Hepatitis B viral factors in HbeAg-negative carriers with persistently normal serum alanine aminotransferase levels. Lin CL, Liao LY, Liu CJ, Yu MW, Chen PJ, Lai MY, Chen DS, Kao JH Hepatology. 2007;45(5):1193–1198.
2) Hepatitis B virus infection: epidemiology and vaccination. Shepard CW, Simard EP, Finelli L, Fiore AE, Bell BP. Epidemiol Rev. 2006; 28:112–125
3) Geneva: World Health Organization; 2015. Guidelines for the Prevention, Care and Treatment of Persons with Chronic Hepatitis B Infection.
4) The epidemiology and prophylaxis of hepatitis B in sub-Saharan Africa: a view from tropical and subtropical Africa**.** Kiire CF. Gut 1996; 38 (suppl 2): S5–S12.
5) Intra-familial prevalence of hepatitis B virologic markers in HBsAg positive family members in Nahavand, Iran Mohammad Alizadeh AH, Ranjbar M, Ansari S, Alavian SM, Shalmani HM, Hekmat L, Zali MR. World J Gastroenterol. 2005 Aug 21;11(31):4857-60. doi: 10.3748/wjg. v11.i31.4857. PMID: 16097058; PMCID: PMC4398736
6) Intra-familial Transmission of Hepatitis B Virus Infection in Arak, Central Iran. Sofian M, Banifazl M, Ziai M, Aghakhani A, Farazi AA, Ramezani A Iran J Pathol. 2016 Fall;11(4):328-333. PMID: 28855924; PMCID: PMC5563930.
7) Exploring risk factors and transmission dynamics of Hepatitis B infection among Indian families: Implications and perspective. Shreyasi Athalye, Naveen Khargekar, Shailesh Shinde, Tejashwini Parmar, Shreya Chavan, Ganesh moorthy Swamidurai, Vaishali Pujari, Priyanka Panale, Priyanka Koli, Aruna Shankar kumar, Anindita Banerjee. Journal of Infection and Public Health 16 (2023) 1109-1114.
8) Malhotra's Ashi-Angel Concept for Effective Management of Hepatitis B and C**.** Parveen Malhotra, Vani Malhotra, Yogesh Sanwariya, Sunita Arora, Babita Rani, Manisha Kumari, Kamlesh Arora, Rajwanti, Sunita, Neha Kumari, Suman, Saroj, Santosh, Anamika, Reena, Neha Gill, Shivani Sharma, Sonal Kochar, Sikander, Naresh, Sandeep, Joginder, Sanjay Kumar, Satish, Deepika, Krishan, Sanjeev Saini and Krishna. Int. J. Adv. Re. 13 (01), 1035-41

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