

Research Article

Effectivity of Hepatitis B Vaccination

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ABSTRACT

Introduction: Hepatitis B poses a significant health problem worldwide. Hepatitis B vaccine as a part of universal immunization, is both cost-effective and efficacious with minimal side effects. The Hepatitis B virus (HBV) vaccine is exceptionally effective, providing 98-100% immunity in healthy individuals who complete the standard 2-to-3-dose series. It is one of the most successful public health interventions, drastically reducing pediatric infections worldwide and providing long-term protection that lasts at least 30 years. The reported side effects of the Hepatitis B vaccine include soreness, redness, or swelling at the injection site, headache, fatigue, and a low-grade fever.

Aim of Study To determine effectivity of hepatitis B vaccination in spouses of Hepatitis B patients and Health care workers.

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 July, 2023 to 30th June, 2026. At our department, as a policy matter, we mandatory screen spouses and other family members for HBV and HCV infection in patients of chronic hepatitis B and C. Moreover, we also have mandatory fully vaccinated all health care workers against hepatitis B. Hence, we tried to check effectivity of HBV vaccination in these two groups, at-least after three years of HBV vaccination. This time period was given for adequate exposure for risk of counteracting hepatitis B infection. Only those spouses were enrolled in the study who were having normal sexual relationships after HBV vaccination. Moreover, only those healthcare workers were enrolled who were having clinical postings after HBV vaccination. Our institute has high footfall of HBV and HCV patients who are treated in various specialities and super-specialities. Moreover, our department is model treatment centre under National viral hepatitis control program and on daily basis 70-80 HBV and HCV patients come for treatment which require endoscopy and indoor admission in many cases. Thus, our 25 staff members are continuously exposed to HBV and HCV infection. In total, total 500 spouses and 500 health care workers were screened with HbsAg test after at least in three years of HBV vaccination. The written informed consent was taken before enrolling in the study and data pertaining to them was analysed.

Observation and Results: Out of total one thousand participant in study group, 500 were health care workers and 500 were spouses of HBV patients. All had received three doses of HBV vaccination. The challenge faced was in certain husbands of HBV infected females who had strong ego. They felt, that they do not need advice of their spouses, as they are main head of family. Hence with persistent efforts took full dose of HBV vaccine. Out of these 1000 participants, none was found to be HbsAg positive after a gap of 3-5 years of complete course of HBV vaccination.

Conclusion: India is having intermediate prevalence of HBV. Hepatitis B vaccination is strongly indicated in health care workers and high -risk groups. The vast majority of vaccinated healthcare workers and spouses of HBV patients remain protected against HBV infection decades after the primary immunization cycle. These results give strong motivation for mandatory HBV vaccination in all health care workers and high-risk groups, including spouses and family members of HBV patients.

Keywords: Hepatitis B Virus, Hepatitis B Vaccination, Challenges, Marriage, Family Screening.

INTRODUCTION

Hepatitis B poses a significant health problem worldwide [1]. The majority of patients are

from the eastern part of the world, including China, Taiwan, and Southeast Asian countries such as India [1-3]. There have been no large

population-based studies from the Indian subcontinent since the publication of the first consensus statements in 2018 [4]. Therefore, most of the available data is based on retrospective data analysis, blood bank donor data, and antenatal screening for viral hepatitis. HBsAg carrier rate in India to be around 4%, placing India in the intermediate range of Hepatitis B prevalence, resulting in a total of 36 million carriers [2]. Among the estimated 400 million HBsAg carriers worldwide, it was believed that India contributed 9% of the total pool of hepatitis B to the world [1,3]. Immunization against hepatitis B disease is recommended for all newborn babies, infants, children, and adolescents up to 19 years of age. It is also recommended for adults who live in areas that have a high rate of hepatitis B disease or who may be at increased risk of infection from hepatitis B virus. These adults include: Males who have sex with males, including those with HIV infection, sexually active persons with multiple partners, health care workers, employees in medical facilities, patients and staff of live-in facilities and daycare programs for the developmentally disabled, morticians and embalmers, police and fire department personnel, and military personnel [5]. Other high-risk groups include chronic kidney disease patients (including on dialysis), chronic liver disease, chronic heart failure, patients of blood clotting disorders who receive transfusions of clotting-factor concentrates, household and sexual contacts of HBV carrier's intravenous drug abusers and prison inmates. When administered within 24 hours of birth, the vaccine is up to 90% effective at preventing perinatal transmission. Full immunization significantly lowers the risk of chronic infection, cirrhosis, and liver cancer [6]. The majority of healthy individuals who respond to the vaccine series maintain protective antibody levels (≥ 10 mIU/mL) decades later [6]. While clinical trials show near-perfect results, real-world community effectiveness and individual responses can vary based on underlying health conditions or risk factors.

Aim of Study

To determine effectivity of hepatitis B vaccination in spouses of Hepatitis B patients and Health care workers.

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 July, 2023 to 30th June, 2026. At our department, as a policy matter, we mandatory screen spouses and other family members for HBV and HCV infection in patients of chronic hepatitis B and C. Moreover, we also have mandatory fully vaccinated all health care workers against hepatitis B. Hence, we tried to check effectivity of HBV vaccination in these two groups, at-least after three years of HBV vaccination. This time period was given for adequate exposure for risk of counteracting hepatitis B infection. Only those spouses were enrolled in the study who were having normal sexual relationships after HBV vaccination. Moreover, only those healthcare workers were enrolled who were having clinical postings after HBV vaccination. Our institute has high footfall of HBV and HCV patients who are treated in various specialities and super-specialities. Moreover, our department is model treatment centre under National viral hepatitis control program and on daily basis 70-80 HBV and HCV patients come for treatment which require endoscopy and indoor admission in many cases. Thus, our 25 staff members are continuously exposed to HBV and HCV infection. In total, total 500 spouses and 500 health care workers were screened with HbsAg test after at least in three years of HBV vaccination. The written informed consent was taken before enrolling in the study and data pertaining to them was analysed.

Statistical Analysis

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

OBSERVATIONS & RESULTS

Out of total one thousand participant in study group, 500 were health care workers and 500 were spouses of HBV patients. All had received three doses of HBV vaccination. The challenge faced was in certain husbands of HBV infected females who had strong ego. They felt, that they do not need advice of their spouses, as they are main head of family. Hence with persistent efforts took full dose of HBV vaccine. Out of these 1000 participants, none was found to be HbsAg positive after a gap of 3-5 years of complete course of HBV vaccination.

TABLE 1. Showing Distribution of Participants Vaccinated and Tested For HBV

Total Vaccinated And Tested Against	Spouses Of HBV Patient	Health Care
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HBV		Workers
1000	500 (50%)	500 (50%)

TABLE 2. Showing Sex Distribution of Participants Vaccinated For HBV in Study Group

Total Vaccinated And Tested Against HBV	Males	Females
1000	630 (63%)	370 (37%)

TABLE 3. Showing Participants Having Challenges and Myths for HBV Vaccination

Total Vaccinated And Tested Against HBV	Hbsag Positive	Hbsag Negative
1000	0 (0%)	1000 (100%)

DISCUSSION

Hepatitis B virus represents an important global health problem. In highly developed countries, mass vaccination campaigns of newborns in recent decades have drastically reduced the proportion of carriers. However, workers exposed to blood and body fluids, including healthcare students, can be at risk of exposure. WHO recommends universal hepatitis B vaccination for all infants, with the first dose given as soon as possible after birth [7]. The hepatitis B vaccine is regarded as one of the most successful viral vaccines globally [8]. Hepatitis B vaccine was universalized nationwide in India in 2011. The UIP schedule recommends hepatitis B birth dose to all infants within 24 hours, followed by three doses at 6, 10 and 14 weeks to complete the schedule. The National Viral hepatitis control program (NVHCP) strongly recommends about mandatory vaccination of health care workers and high-risk groups. In our department due to implementation of Jeevan Rekha Project & NVHCP through which there is provision of free HBV vaccination. There is lot of thrust on counselling which includes testing especially of the spouses and family members of HBV and HCV patients and HBV vaccination. 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 HCV and HBV. Thus, we were able to convince majority of patients and their close contacts for HBV vaccination. Moreover, our institute is a tertiary care center, hence has a big team of 8000 health care workers, thus we had opportunity under NVHCP for free HBV vaccination and thus determining of challenges associated with it. Additionally, a survey of healthcare professionals reveals that while most healthcare professionals are aware of and adhere to national vaccination

recommendations, many do not actively recommend hepatitis B vaccination for high-risk populations, perceiving their risk to be low. The survey also highlights out-of-pocket costs as a significant barrier preventing high-risk individuals from accessing hepatitis B vaccination [9]. There is a risk for occupationally acquired hepatitis B among healthcare workers (HCWs), including healthcare students, largely due to exposures to patients with chronic HBV infection, with the estimated attributable fraction within this occupational group reaching 37% [10]. Estimates suggest that around 1% of all HCWs are infected with HBV [11], and although less than 5% of infected adults develop chronic infection, this progression not only represents a risk of complications, including liver cirrhosis and hepatocellular carcinoma, at the patient level, but also a source of transmission to others at the population level [12]. The findings of one study demonstrated that the vast majority of students and resident doctors vaccinated with a complete anti-HBV primary immunization cycle maintain an effective humoral immunity against this pathogen decades after vaccination. Indeed, three out of four students showed a protective HBsAb titer (≥ 10 mIU/mL) at the first serological assessment performed at the medical visit prior to occupational exposure. Furthermore, among those that did not show the correlate of protection, over 90% demonstrated an anamnestic response on a challenge dose [13]. Devi Ratna Sulistina showed that adult group showed that the hepatitis B vaccine could protect people for 30 years. This group is similar to newborns, children, and adolescents. These groups do not require a booster because the Hepatitis B vaccine can provide 5-23 years of protection [13]. In our study group, no one developed HBV infection which is indirect marker of effectivity of HBV vaccination. This exceptional high response

rate can be explained on basis of recipients who were not having any condition like HIV, chronic liver or renal disease, immunosuppressed stage which led to decreased protective response of HBV vaccination.

CONCLUSION

India is having intermediate prevalence of HBV. Hepatitis B vaccination is strongly indicated in health care workers and high -risk groups. The vast majority of vaccinated healthcare workers and spouses of HBV patients remain protected against HBV infection decades after the primary immunization cycle. These results give strong motivation for mandatory HBV vaccination in all health care workers and high-risk groups, including spouses and family members of HBV patients.

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.

Limitation of Study: The main limitation of study was indirect measurement of protectiveness developed by HBV vaccination by testing for HbsAg. There can be some cases who may develop occult HBV infection in which HbsAg is negative and HBV DNA quantitative is positive. Moreover, anti-Hbs antibody test tells better protectiveness of HBV vaccine but due to non-availability of in-house testing, it was not done to prevent financial burden on the participants.

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