



HEPATITIS B VACCINATION DRIVE: AN EXPERIENCE AT A TERTIARY CARE HOSPITAL.

Microbiology

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ABSTRACT

Introduction: Health care workers are at occupational risk of exposure to blood borne pathogens. Hepatitis B virus (HBV) infection is an occupational risk and percutaneous exposure is the mode of transmission. Poor knowledge and accessibility of Hepatitis B vaccine are important factors for low vaccine compliance amongst HCWs. Thus, Hepatitis B vaccination drive was initiated in our institute to improve immunization coverage amongst HCWs.

Aims and Objectives:

1. To discuss the procedural aspect of vaccination drive.
2. To find the challenges faced with respect to availability of vaccine, place, human resources, accessibility and achievement of vaccination course completion.
3. To assess the level of completion of the vaccination.

Materials and Methods: After taking permission from head of institution to carry out vaccination drive, procurement of vaccine and consumables, forming a HICC team, allocating a prime location, increasing time for vaccination drive and preparedness of a unique software for reminder calls; Hepatitis B vaccination drive was carried out in four phases from Sept 2017 to Oct 2019. **Results:** 3401 HCWs enrolled for Hepatitis B vaccination during the period Sept 2017 to Oct 2019. 1614 males and 1787 females were enrolled with male to female ratio of 0.9:1. There was 92% complete vaccination with 8% drop out rate. Maximum drop-out rate was observed in Class IV workers (60.7%). **Conclusion:** Easy accessibility, reminders calls and strong administrative support for Hepatitis B vaccination drive successfully increases the number of vaccinees, decreases drop out rates and increases awareness amongst HCWs towards injection safety.

KEYWORDS

Hepatitis B, Vaccination drive, Hepatitis B vaccination drive, HBV

INTRODUCTION

Health care workers (HCWs) are at higher risk of infection due to their continuous interaction with patients infected with Hepatitis B (Symptomatic as well as asymptomatic). Mostly, patients with hepatitis B infection remains asymptomatic. Symptomatic patients present with symptoms of fever, joint pain, jaundice in acute phase and severe liver disease like cirrhosis and liver failure in chronic cases. As per WHO, one third of the population throughout the world is infected with Hepatitis B infection.^[1] In developing countries, the prevalence is reported to be between 5% to 20%.^[1] Although vaccination is available since 1982,^[2] it was included in the Universal Immunization program in 2007-08.^[3] Even then, less than 50% of children get hepatitis B vaccinated.^[1] However, HCWs may not be covered in this program. This leads to double impact of Hepatitis B on the HCWs, one being non vaccinated and other being continuous exposure.

Apart from these two reasons, needle stick injury too poses a risk to HCWs. The rate of needle stick injuries among health care workers handling waste in the hospital setup is reported to be as high as 18% due to improper segregation of waste risking the HCW to blood borne diseases e. g. Hepatitis B.^[4] Recently, Biomedical Waste (BMW) Management Rules 2016 has made it mandatory for vaccination of all the health care workers.^[5] The compliance to Hepatitis B vaccination amongst HCWs is known to be poor.^[6] Different ways are known to provide mandatory vaccination at the time of job recruitment, providing free vaccination at the vaccine OPD, free vaccination for medical students etc. With the requirement of three doses (0, 1 and 6 months), it becomes more difficult to complete the course of vaccination especially amongst the labour staff.

As Hepatitis B vaccination was mandatory under 2016 BMW Management Rules,^[5] a survey regarding the vaccination status amongst HCW of all departments and of all categories was carried out in April 2017. [unpublished data] This survey helped to find out the number of HCWs who required Hepatitis B vaccination. This survey was carried out by sending a format which captures name, designation and vaccination status to all the heads for faculty and postgraduate students, Matron, Principal of nursing school, Class representatives of undergraduate students, Time keeper (TK) for all labour staff and Administrative Officer. Feedback regarding vaccination status before

starting the study shows that there was an average 44.9% vaccination coverage amongst HCWs with lowest amongst Labour staff (23%), nursing staff (27%), technicians (44%) and maximum amongst medical professionals (62%).

Data collected from survey revealed that Hepatitis B vaccination was not up to the mark though there was a dedicated OPD. Reasons being remote location, restricted timings i. e. 1.30 - 3.30 pm, mandatory case paper, need for pre and post vaccination blood draw and forgetfulness of last dose. Hence, it was decided that institution's Hospital Infection Control Committee (HICC) would take lead for better coverage of Hepatitis B vaccination for all HCWs.

Aims and Objectives

1. To discuss the procedural aspect of vaccination drive.
2. To find the challenges faced at different levels with respect to availability of vaccine, place, human resources, accessibility, attracting multiple groups of HCWs and achievement of vaccination course completion.
3. To assess the level of completion of the vaccination course amongst different HCWs.

MATERIALS AND METHODS

The present study was a retrospective study of hepatitis B vaccination drive, which was initiated after obtaining approval from the Institutional Ethics Committee (EC/OA/163-2020). The vaccination drive was conducted for the period from September 2017 to October 2019 and was statistically analyzed and presented in proportions.

Hepatitis B vaccination drive:

The Hepatitis B vaccination drive was carried out at a 2250 bedded tertiary care teaching hospital in which 3500 health care workers and approximately 3000 UG/PG students were the target population. Vaccination drive was carried out in four phases (Sept 2017 to Oct 2019).

Permission was taken from the head of institution to conduct vaccination drive and purchase of consumables. Procurement of Hepatitis B vaccine (DNA recombinant vaccine) and other consumables like cotton, 70% alcohol, syringes, needles and

Biomedical waste bags and sharp containers was carried out. Arrangement of refrigerator for maintaining cold chain for the vaccine and tables, chairs was done.

A prime location within the campus approachable for all HCWs was selected which was a well-ventilated room of 100-120 square feet which is well lit and sufficient with two entries preferred (one for entry and other for exit) at ground floor of UGPG hostel next to TK office where all labour staff visit for daily attendance. HICC team including Infection control officer, one lecturer, two staff nurses and one data entry operator was given the responsibility to conduct vaccination drive. One medical officer was allocated from dept. of preventive and social medicine at the site of vaccination to resolve adverse reactions if any.

Timing of vaccination increased to eight hours from 9am to 5pm covering the first as well as second shift HCWs and selecting first month for vaccination in such a way that the second and third dose do not come during vacation period as it led to major drop outs. There was no mandatory requirement of case paper or blood testing. Awareness about vaccination drive was carried out in the hospital by displaying posters, notice board at TK office and circular was sent to all the head of departments and matron.

Preparation of a unique software used for reminder call for second and third dose. This software was used to send SMS with one click to all HCWs for their respective vaccination date. To increase the uptake of vaccination, it was decided to conduct the vaccination drive phase wise. [Figure 1]

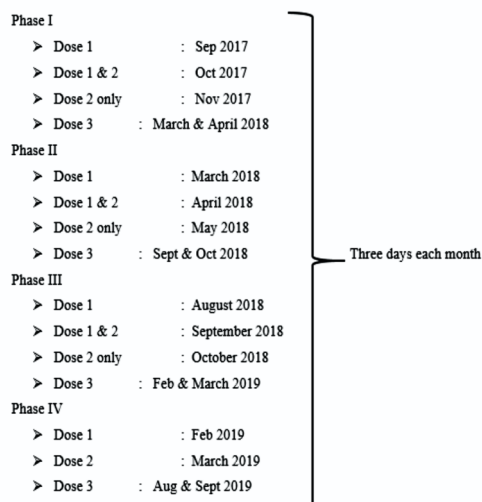


Figure 1: Schedule of vaccination drive

A register was maintained to record the details of HCWs. For Phase 1 and Phase 2, labour staff was targeted while for Phase 3 and Phase 4, targeted HCWs were medical students and nursing staff. Phase 1 to 3 were for three consecutive months to cover maximum permanent staff of the hospital. Phase 4 onwards vaccination drive was conducted for two consecutive months as only newly joined HCWs were the target population. Reminder calls for second and third dose were sent daily three days prior to 2nd and 3rd dose till the time HCW has taken the dose. SMS software was introduced after phase 1. Lastly, a certificate of completion was provided.

RESULTS

A total of 3401 HCWs enrolled for Hepatitis B vaccination in four phases during the period Sept 2017 to Oct 2019 which includes 1614 males and 1787 females with male to female ratio of 0.9:1.

On category wise distribution, there was maximum enrollment of Medical students (34.7%) followed by Class IV employee (29.4%). Targeted group in phase 1 was labour staff with maximum enrollment 61.7%. In phase 2, Nursing students and labour staff were maximally enrolled with 27.3% and 26% respectively. For phase 3, targeted population was medical students 63.5% and in phase 4 again medical students were enrolled maximally with 62.9%. Category others

included security, clerk and administrative staff. [Table 1]

Table 1: Category wise distribution

Category	Phase 1	Phase 2	Phase 3	Phase 4	Total	
Class IV employee	701 (61.7%)	202 (26%)	68 (5.6%)	30 (11.1%)	1001	29.4%
Nursing students	171 (15%)	212 (27.3%)	96 (7.9%)	1 (0.4%)	480	14.1%
Nurses	38 (3.3%)	41 (5.3%)	125 (10.3%)	55 (20.4%)	259	7.6%
Laboratory workers	45 (3.9%)	52 (6.7%)	37 (3%)	2 (0.7%)	136	4%
Medical students	60 (5.3%)	176 (22.7%)	773 (63.5%)	170 (62.9%)	1179	34.7%
Others	121 (10.6%)	94 (12.1%)	119 (9.8%)	12 (4.4%)	346	10.2%
Total	1136	777	1218	270	3401	

There was 92% complete vaccination was achieved amongst all those enrolled in vaccination drive with 8% drop-out rate. Second dose drop-out rate was more as compared to third dose i. e. 4.7% vs. 3.3%. [Table 2] Maximum drop-out rate was observed in Class IV workers (60.7%) followed by Nurses and others (14.7%). Drop-out rate was maximum in Phase I. [Table 3] Vaccine coverage due to Hep B vaccination drive amongst all categories of HCWs after phase 4 was 98.8% in medical professionals, 94.1% in technicians, 84.5% in nurses and 83.5% in labour staff.

Table 2: Vaccination completion status

Category	Phase 1	Phase 2	Phase 3	Phase 4	Total	
Completed course	995	709	1170	255	3129	92%
Missed 2nd dose	73	52	30	6	161	4.7%
Missed 3rd dose only	68	16	18	9	111	3.3%
Incomplete course (Total)	141	68	48	15	272	8%

Table 3: Category wise distribution-drop outs

Category	Phase 1	Phase 2	Phase 3	Phase 4	Total	
Class IV employee	100	36	23	6	165	60.7%
Nursing students	5	0	0	0	5	1.8%
Nurses	11	14	9	6	40	14.7%
Laboratory workers	2	5	1	0	8	2.9%
Medical students	6	3	3	2	14	5.1%
Others	17	10	12	1	40	14.7%
Total	141	68	48	15	272	
	141/1136	68/777	48/1218	15/270		
	12.4%	8.8%	3.9%	5.6%		

DISCUSSION

Hepatitis B virus (HBV) infection is a well-recognized occupational risk and percutaneous exposure is the most efficient mode of transmission.^[7] India falls in the intermediate endemicity zone (prevalence of 2–7%, with an average of 4%), with a disease burden of about 50 million.^[8] The most essential step in treatment is prevention of HBV infection by vaccination.

A universal immunization program (containing vaccination against hepatitis B) was introduced in India in 1985 and became part of the Child Survival and Safe Motherhood program in 1992.^[9] A cost efficacy study showed that the inclusion of hepatitis B vaccine in India's national immunization program would lead to a reduction in HBV carrier rate from 4.0% to 1.15%.^[9] Vaccination against hepatitis B was piloted in 2002–03 and subsequently integrated into National Rural Health Mission in 2005. Initially, it was introduced in certain districts and cities in 2003, and its subsequent success was followed by its being taken up by 10 states in 2008; full-country coverage started in 2011.^[10] Various studies conclude that there is low vaccine compliance amongst HCWs and attitude, poor knowledge of Hep B infection and accessibility were important factors for the same.^[6,11] Thus, this Hepatitis B vaccination drive was initiated in our institute to improve immunization coverage amongst all categories of HCWs.

A survey was conducted before starting the vaccination drive to get an idea of number of HCWs who need to be vaccinated and only 1004/6500 (15.4%) responses were received. Based on the analysis, overall vaccine coverage was found to be 44.9% at our institute and category wise labour staff were found to be with the lowest complete vaccination coverage of 23%. Labour staff are the most difficult group to vaccinate because of lack of awareness, multiple shift duties, need for multiple doses and poor accessibility. Similar findings were found in other studies.^[6,11,12]

According to these studies; accessibility of HBV vaccine, knowledge, perception of HBV risk and negligence were some important factors for noncompliance. There was very poor vaccination coverage with only 5.4% as per Ethiopia study by Abeje G et al (2015)^[13] and 19% in South Africa study by Tatsilong HO et al (2016)^[14] and lack of knowledge about Hep B infection, mode of transmission and motivation for vaccination amongst HCWs were the reasons in both these studies.

In our survey, Hep B vaccination coverage amongst other HCWs i. e. nursing staff, technicians and medical professionals were 27%, 44% and 62% respectively. Similar findings were found in Ghomraoui FA et al study from Saudi Arabia (2015)^[15] with 59.5% vaccination coverage amongst medical professionals with forgetfulness and busy schedule were the reasons amongst non-vaccinated. A study from Nigeria by Abiola AH et al (2016)^[16] had similar finding with 48.5% vaccination coverage amongst doctors and nurses. Non-availability and fear of needle prick were the reasons for poor compliance. A study from Nepal by Bhattarai S et al (2012)^[17] had 86.5% vaccination coverage amongst medical and nursing students. Lack of vaccination program was the main reason amongst non-vaccinated in this study. High vaccination coverage in this study may be due to involving targeted population i. e. medical and dental interns and nursing students.

At our institute, exclusive vaccination OPD was available since 2013 but uptake was minimal may be because of remote location, mandatory OPD case paper, restricted timings. Regular BMW training sessions were carried out to stress upon vaccination. Also, there was need to draw blood for pre vaccine HBsAg test and post vaccine antibody titer and lengthy gap of five months before third dose were the reasons for noncompliance amongst HCWs and poor vaccination coverage.

Thus, taking into consideration all these pitfalls, there were some challenges like improving accessibility, administrative support, availability of consumables, attracting multiple groups of HCWs and achievement of vaccination course completion. Keeping the aim of increasing vaccine coverage; a suitable location was chosen in the center of the hospital campus. WHO policy^[18] of 2017 for Hepatitis B vaccination for HCWs was implemented for which pre and post vaccination tests were not recommended.

Total number of HCWs enrolled for vaccination drive in Phase 1,2,3 and 4 were 1136, 777, 1218 and 270 respectively. To vaccinate maximum number of HCWs, initial 3 phases were extensively carried out with three consecutive months keeping 3 days long vaccination drive for each month from 9am to 5pm.

There was 92% complete vaccination was achieved amongst all. The biggest challenge was to complete the vaccination course of each employee. Reminder call was the most important part of the vaccination drive. It was very important to give reminder call for second and third dose for more than 60% of HCWs for all three days till the HCW has taken the dose. Different communication tools like Whats app messages, placing banner at common sites, writing notice boards, placing circulars at places like near biometric machines where HCWs visit twice daily was carried out. Regular SMS and phone calls were made during phase 1, however, as it was too cumbersome; a reminder SMS software was created. Many HCWs appreciated this SMS facility.

Vaccination coverage amongst various categories of HCWs was increased due to vaccination drive as compared to pre-vaccination drive data. i. e. increase in vaccination coverage in pre-vaccination drive and post-vaccination drive for labour staff was 23% to 83.5%, for nursing staff 27% to 91.7%, for technicians 44% to 94.1% and for medical professionals 62% to 91.85% and this difference was statistically significant at p value <0.05 [p value <0.00001].

There was 8% drop out rate. Individually, second dose drop-out rate was more as compared to third dose i. e. 4.7% vs. 3.3%. Reduced dropout rate for third dose can be due to the vaccination drive schedule

with availability of three consecutive month vaccination drive in next phase. Drop-out rate was maximum in phase 1 (12.4%) as compared to other phases (3.9% to 8.8%) due to introduction of reminder SMS software facility after phase 1. Maximum drop-out rate was observed in Class IV workers (60.7%). One more study from Maharashtra in 2018 done by Sardesai RV et al gives information about the least awareness amongst class IV HCWs and maximum number of needle stick injuries amongst them.^[19] Thus knowledge, basic awareness about Hepatitis B as occupational hazard and constant training along with targeted vaccination drive is the need of time.

CONCLUSION

Considering easy accessibility of Hepatitis B vaccination, reminder calls/ SMS, software and strong administrative support; Hepatitis B vaccination drive successfully increases the number of vaccinees, improves complete vaccine coverage, decreases drop out rates and plays a major role in increasing awareness amongst HCWs towards injection safety and protection against hepatitis B. Reminders, Banners, Notice boards help to reduce dropout rates and reminder SMS software plays as add on technology in medical field. Still dropout rate remains a cause of concern which needs to be constantly improved.

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