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Awareness and status of Hepatitis B vaccination among health care workers in a tertiary care centre of North India.

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ABSTRACT

Introduction: Hepatitis B infection is the most transmissible blood borne infection and also a Vaccine preventable viral disease vaccine preventable disease. Health care worker (HCWs) are at increasing risk of acquiring Hepatitis B infection (10-30%). This study aims to estimate the awareness regarding various aspects of hepatitis B vaccination such as vaccination status, protective antibody titre and the prevalence of hepatitis B infection). Materials and method: Study included 400 HCWs (250 doctors, 100 nurses, and 50 technicians) of Lady Hardinge Medical College & Associated Hospitals, New Delhi. A self structured pretested questionnaire was used as a tool in the study. The level of awareness was graded (adequate, fairly adequate and inadequate) on the basis of their knowledge. Blood samples were collected from all the participants & subjected to ELISA test for detection of Hepatitis B surface antigen (HbsAg) and estimation of anti Hepatitis B antibody titer (anti HBs Ab) titre. Results: 34.4% doctors, 18% nurses and 4% technicians had overall adequate awareness level regarding various aspects of Hepatitis B vaccination. The difference between adequate awareness level among all the three groups of HCWs were significant (P <0.05). Sixty seven percent (67%) HCWs had a protective level of AntiHbsAb level (≥10mIU/ml). Out of 400 HCWs 227 (56.7%) were fully vaccinated (3 dose), 112 (28%) partially vaccinated (1 0r 2 dose) and 61 (15.2%) had no vaccination against Hepatitis B. No HCWs were positive for HBsAg. Conclusion: Every hospital must raise the awareness regarding Hepatitis B vaccination among HCWs and must ensure all the HCWs are vaccinated & immunized.

Keywords: Awareness, Health care workers (HCWs), Hepatitis B vaccination, AntiHbsAb.

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INTRODUCTION

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Among all the blood borne infections, Hepatitis B is not only the most transmissible infection, but also the only one that is preventable by vaccination. Hepatitis B infection has evolved as a major public health problems globally and is the tenth leading cause of death. Nearly 2 billion people have been estimated to be infected with HBV worldwide and more than 240 million people have chronic liver infections. Among Heath Care Workers, seroprevalence is two to four times higher than that of normal population. [1, 2, 3]

Hepatitis B vaccine has been available in the world since 1982. The HBV vaccine is 95% effective in preventing infection and its chronic consequences. World Health Organization (WHO) has recommended vaccination for all HCWs who are at occupational risks of acquiring hepatitis B virus infection. [2, 4.]

According to the WHO estimates, vaccination coverage from 18% in Africa to 77% in Australia and New Zealand. In United States, 75% of the HCWs at risk had received three or more doses of hepatitis B vaccine[3].

Unfortunately, the WHO has estimated that HBV vaccination coverage amongst HCWs is only 18-39% in low and middle – income countries compared to 67-79% in high income countries. [5]

In developing countries like India, due to various reasons such as lack of awareness, risk assessment and low priority given by health management, HBV vaccination coverage among HCWs is estimated to be very low. Most of the hospitals lack post-exposure management strategies including the coordination among various departments for reporting, testing, and vaccination. [1]

It should be compulsory for all HCWs who might be exposed to blood and body fluids in an occupational setting to receive complete Hepatitis B vaccination. There should be a protocol to check Anti HBsAb titre in blood sample of each and every HCWs working in any health care setting who are dealing with blood and body fluids. If the titre for Anti HBsAb is found to be low (<10 IU/ml), then, the respective HCW should be vaccinated against HBV at the earliest. [1]

With this background, the present study was conducted among the HCWs of Lady

Harding Medical College and Associated hospitals with the following objectives Harding Medical College and Associated hospitals with the following objectives:

- To assess the awareness regarding Hepatitis B vaccination among the HCWs
- To estimate the percentage of HCWs who were vaccinated against Hepatitis B infection.
- The estimate the percentage of HCW with protective level of anti-Hbs Ab titer.
- Prevalence of Hepatitis B infection among the HCWs.

MATERIALS AND METHOD

The present study was a cross sectional study conducted for a period of one year and three months among 400 HCWs (150 resident doctors, 100 interns, 100 nursing professionals, 50 laboratory technicians) of LHMC and associated hospitals (SSKH & KSCH), selected randomly who were willing to participate in the present study. These 400 HCWs included in the study were from various departments of LHMC & Associated Hospitals such as Medicine, Surgery, Obstetrics & Gynaecology, Pediatrics, Orthopedics, Ophthalmology, ENT, Pathology, Microbiology, Biochemistry, Anesthesia, Community Medicine and psychiatry.

A self structured pretested questionnaire was used as a tool to access HCWs awareness regarding Hepatitis B vaccination. The initial part of the questionnaire was having demographic information of the participant such as occupation, age, sex, work experience and current posting, whereas rest were the questions related to Hepatitis B vaccination. Various Departments (as mentioned above) of LHMC & Associated Hospitals (KSCH & SSKH) were visited on rotational basis and HCWs who gave voluntary consent for participation in the study were given 10 minutes each to answer the questionnaire in an independent and unbiased way without any undue pressure, maintaining the confidentiality of their identity.

The data obtained from the questionnaires was evaluated by giving 1 point for each correct answer given by the participants. There was no negative marking for wrong answers. The level of awareness was graded (adequate, fairly adequate and inadequate) on the basis of their knowledge regarding that particular practices. A score of more than 70% was considered adequate awareness, 50–70% fairly adequate awareness, and less than 50% was taken as inadequate awareness. Finally, HCWs are considered to be aware of a particular practice, when the overall awareness (i.e. adequate+ fairly adequate) is more than 50%.

3 to 5 ml of blood sample was collected from each participant in a plain, clean, sterile, leak proof vial. All the samples were subjected to ELISA test for detection of HbsAg [Kit used: Monalisa^{TM} HBs Ag ULTRA manufactured by BIO-RAD Laboratories (India) Pvt. Ltd.] and estimation of anti HBs Ab titre [Kit used: Monalisa^{TM}Anti –HBs PLUS manufactured by BIO-RAD Laboratiries (India) Pvt. Ltd.] as per the kit manufacturers guidelines.

Data obtained from the questionnaires was analyzed by using SPSS software. Descriptive statistics was used to calculate percentages for each of the responses given. Chi-square test for comparing percentages across groups, ANOVA for comparing means across more than 2 groups and Unpaired t-test for comparing means than 2 groups were the statistical methods used in the present study. A P value less than 0.05 was considered significant.

RESULTS AND DISCUSSION

Out of 250 doctors, 100 nurses and 50 laboratory technicians (Total HCW 400) included in the present study, 23.2% were male and 76.7% HCWs were female. Majority (60.25%) of the study population belonged to the age group of 20-30 yrs (mean age 30.72 yrs). Most (23.5%) of HCWs were from Department of Obstetrics & gynecology followed by Surgery(15%) and medicine (14.75%) department.

Overall awareness regarding Hepatitis B vaccination:

The present study shows that 34.4% doctors, 18% nurses and 4% technicians had overall adequate awareness level regarding various aspects of Hepatitis B vaccination such as awareness regarding vaccine preventable diseases, hepatitis B vaccination schedule and protective level of AntiHbsAb titre . Fairly adequate level of awareness was 41.6%, 36% and 22% among doctors, nurses and technicians respectively. Regarding Hepatitis B vaccination 24% doctors, 46% nurses and 74% technicians were found to have inadequate awareness level. The difference between adequate awareness level among all the three groups were significant ($P<0.05$) (Table :1)

Vaccination status of the HCWs-

A total of 227 HCWs were fully vaccinated, 112(28%) partially vaccinated and 61% of HCWs had no vaccination against Hepatitis B. Out of 227 fully vaccinated HCWs, the percentage of doctors, nurses and technicians was 63.2%, 57% and 24% respectively. Similarly, out of 112 partially vaccinated HCWs, 29.2% were doctors, 21% nurses and 36% were technicians. Among those 61 HCWs without any vaccination of Hepatitis B , the percentage of doctors, nurses and technicians was 6%, 22% and 40% respectively. (Table:2)

Table 1: Overall awareness regarding Hepatitis B vaccination:

Awareness level Hepatitis B vaccination	Doctor(n=250)		Nurse(n=100)		Technician(n=50)		p-value		
	No.	%	No.	%	No.	%	Doctor Vs. Nurse	Doctor Vs. Technician	Nurse Vs. Technician
inadequate	60	24.00%	46	46.00%	37	74.00%	<0.001	<0.001	0.001
fairly adequate	104	41.60%	36	36.00%	11	22.00%	0.167	0.005	0.041
adequate	86	34.40%	18	18.00%	2	4.00%	0.001	<0.001	0.009
TOTAL	250	100%	100	100%	50	100%			

Table 2: vaccination status of the HCWs:

Vaccination status	No. & percentage of Doctors		No. & percentages of Nurses		No. & percentages of Technician		p-value		
	No.	%	No.	%	No.	%	Doctor Vs. Nurse	Doctor Vs. Technician	Nurse Vs. Technician
no vaccination (no dose)	19	7.60%	22	22.00%	20	40.00%	<0.001	<0.001	0.010
Partial vaccination (1or 2 dose)	73	29.20%	21	21.00%	18	36.00%	0.059	0.170	0.024
full vaccination (3 doses)	158	63.20%	57	57.00%	12	24.00%	0.141	<0.001	<0.001
TOTAL	250	100%	100	100%	50	100%			

Anti HbsAb levels of the HCWs:-

In the present study out of 400 HCWs, 268 (67%) had a protective level of AntiHbsAb level. Among this group of HCWs having protective level of Anti HbsAb titer, 77.6% were doctors, 54% were nurses and 40% were technicians.

Out of 227 HCWs(56.4%) who were fully vaccinated, 81.06% of them had positive titer (≥10mIU/ml) . Among 112 partially vaccinated HCWs, 65.18% had positive titer (≥10mIU/ml). The Postive titre ((≥10mIU/ml) was also found in 18.03% of HCWs who were never vaccinated for hepatitis B (not even single dose). (Table : 3)

Prevalence of Hepatitis B infection among the HCWs:

No HCWs were found to be positive for HbsAg .

Table 3: Correlation between the vaccination status and the titer levels of HCWs:

Titer →	No. of HCWs	Positive titer (≥10mIU/ml)		Negative titer (<10mIU/ml)		p-value
vaccination ↓		n	%	n	%	
no vaccination (0 dose)	61	11	18.03%	50	81.97%	< 0.001
partial vaccination (1or 2 dose)	112	73	65.18%	39	34.82%	
full vaccination (3 doses)	227	184	81.06%	43	18.94%	
TOTAL	400	268		132		

Vaccination against Hepatitis B is must for all the HCWs. WHO has estimated only 18-39% vaccination coverage of Hepatitis B among HCWs of low & middle income countries compared to 67-79% in high income countries. [5] HBV vaccinations is now part of national routine immunization program for children in India. HBV vaccination in HCWs including medical students and trainees in India is recommended but not strictly enforced or mandatory like in United Kingdom (UK) and Spain. [6, 7]

In the present study done among 400 HCWs(250 doctors, 100 nurses and 50 technicians), correct knowledge regarding Hepatitis B vaccination schedule and the protective levels of anti HBsAb titer among the HCWs was 78.5% and 48.8% respectively. Among the HCWs, doctors had highest (72%) knowledge compared to nurses (56.5%) and technicians (36%). The overall awareness regarding Hepatitis B vaccination was found to be 64.3%. Among the HCWs, 56.8% were fully vaccinated (3 dose), 28% partially vaccinated (1 or 2 dose) and 15.25% were not vaccinated. The full vaccination (3 dose) coverage was highest among doctors (63.2%) followed by nurses (57%) and technicians (24%). This finding shows that the proportion of vaccinated HCWs differed in various occupational groups and this difference is statistically significant ($p<0.05$). The difference of vaccination coverage among different groups can be explained on the basis of their education and awareness regarding

HBV vaccination. The coverage of hepatitis B vaccination among the HCWs in developing countries is quite variable (6% to 80%). [8,9 ,10] Two studies conducted by Singhal V et al and Sukriti et al in Delhi showed the vaccination coverage among HCWs ranged between 50-60%. [1] These variability of vaccination coverage depends on the economic status and funds allocated to preventive health care by a country.

In our study the protective level of anti HBsAb titer (≥10 mIU/ml) was 81.6% among the HCWs with complete vaccination. Jha A K et al (Delhi, 2012) and Sukriti et al (India,2008) also reported similar findings i.e. the percentage of HCWs who had protective level of anti HBsAb titer after complete vaccination was 73.5% and 82.2% respectively. [11, 12]

This finding in our study indirectly shows that not all the HCW who had complete vaccination had protective titer level i.e. 18.94% HCWs with complete vaccination had not achieved protective antibody levels and they were still susceptible to acquire infection. The reason for such finding may be due to the fact that they might have taken the vaccination many years before and the antibody titer level has gone below the protective level at the time of testing of Anti HBsAb titer. These HCWs were asked to take a booster dose of Hepatitis B vaccine and to check for Anti HBsAb titer level after 1 month of booster dose.

On the other hand, out of the total 61(18.03%) HCWs who were not vaccinated at all, 18.03% of them also had protective level of anti HBsAb titer. It may be due to the acquisition of natural infection sometime in the past which conferred natural immunity to this group of HCWs. Among the partially vaccinated (1 or 2 dose) HCWs, 65.18% also had protective Anti HBsAb level. This finding shows that even with incomplete vaccination some people developed seroprotection which may be due to individual's immune response or simultaneous natural infection. Our finding are similar to a study conducted on HCWs in a tertiary care hospital in Delhi, where 53.3% of partially vaccinated HCWs had positive titer of AntiHbsAb . The protective levels of AntiHbsAb was seen in 39.1% of HCWs who were not vaccinated against HBV.[68] Another study in Delhi also showed that 36% of the unvaccinated HCWs had protective antiHbsAb titer levels. [12]

Jha A K et al (New Delhi, 2012) reported prevalence of HBV infection (HBsAg positive) to be 1.4% among the HCWs.[11] The percentage positivity of HbsAg in another study conducted in New Delhi was found to be 1%. [1]But in our study, no HCW was found to be positive for HBsAg.

CONCLUSION

The Coverage of hepatitis B vaccination is low among the HCWs mainly in the developing countries reason being the low awareness regarding Hepatitis B vaccination and the unavailability of Hepatitis B vaccine . The present study puts light on the fact that that every

hospital should establish a strict policy for hepatitis B vaccination for all categories of HCWs at the time of their recruitment in the hospital. This policy should also cater the medical and nursing students at the time of their admission in the institution. Assessment of Anti HBsAb titer of all the HCWs should be done after complete vaccination to assess the immunization status of the HCWs. Moreover, every HCWs must be aware of hepatitis B vaccinations. In order to raise the awareness among these HCWs, regular training programme must be conducted by all the hospitals for all category of HCWs at the time of their recruitment. Refresher training programme should also be conducted to update the knowledge of HCWs on regular basis. In order to raise the awareness from very beginning, awareness regarding Hepatits B vaccination should be also initiated in the teaching curriculum of medical & nursing students.

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