Original Article

Hepatitis B Vaccination

Hepatitis B Vaccination Coverage in Health Care Providers in Tertiary Care Hospitals: A Multicenter Study from Pakistan

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ABSTRACT

Objective: To determine the frequency of vaccination coverage against hepatitis B virus (HBV) in Health Care Workers (HCWs) in tertiary care hospitals and to identify the common barriers to vaccination.

Study Design: Descriptive / cross-sectional study

Place and Duration of Study: This study was conducted at the ten Tertiary Care Hospitals of Pakistan located in Rawalpindi, Islamabad and Peshawar from January 2018 to May 2018.

Materials and Methods: HCWs were evaluated through a self-administered questionnaire which included questions about demographics, HBV vaccination status and reasons for incomplete vaccination. Categorical variables were shown in percentages and Chi square test was used to determine the determinants of vaccination.

Results: Of the total 1130 participants, 693 (61.3%) were males and mean age of the study participants was 28.8± 6.69 SD years. Of the total, 590 (52.2%) were fully vaccinated, 188 (16.6%) partially vaccinated, 307 (27.2%) non-vaccinated while 45 (4%) could not recall their vaccination history. Negligence followed by lack of knowledge were reported as common barriers to vaccination. Statistically significant association among age (p=0.025), type of profession (p< 0.001), duration of employment (p=0.035) and hepatitis B vaccine coverage was observed.

Conclusion: There was low hepatitis B vaccine coverage among HCWs. A free and mandatory immunization program should be offered to all HCWs to achieve 100% vaccination coverage and ensure their protection against HBV.

Key Words: Hepatitis B vaccination; Healthcare workers; Tertiary care hospitals, Pakistan.

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INTRODUCTION

Hepatitis B virus (HBV) causes a potentially life-threatening infection associated with significant morbidity and mortality worldwide. According to World Health Organization (WHO) estimates, HBV infects approximately two billion people worldwide (30% of the world's population) as documented by serologic evidence of previous or current HBV infection.[1] The global prevalence of hepatitis B surface antigen positive population is 3.9%.[2] Course of chronic hepatitis B can be complicated by liver failure or hepatocellular carcinoma which causes at least 786,000 deaths annually worldwide.[3]

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Being the 10th major deaths-causing disease, HBV has gained the status of global public health threat.[4]

HBV transmission can result from exposure to infected body fluids such as blood, serum, semen and vaginal secretions. Common routes of HBV transmission are sexual, vertical and parenteral like transfusion of blood and blood products, hemodialysis, intravenous drug abuse, unsafe injections and needle stick injuries. HCWs fall in the last category. Unvaccinated HCWs are four times more at risk of contracting HBV infection than general population.[5] HBV transmission from HCWs to patients has been documented.[5] The chances of contracting HBV infection after a single needle stick injury from HBsAg positive patient range from 6% to 40% depending on HBeAg-status.[6] In health care settings, risk of non-percutaneous exposure can contribute further to HBV transmission.[6]

Transmission of HBV can be prevented by adherence to universal infection control measures and vaccination against HBV. Vaccine against HBV is safe and effective with 95% seroconversion or immune response rates. Vaccination is the most effective method of preventing hepatitis B infection and its long term consequences.[6] Vaccination is recommended for high risk population including HCWs which significantly decreases the chances of getting HBV infection. In developing countries, 42.62% of HBV infection in HCWs was attributed to exposure in health care settings

while in developed countries the attributed fraction was less than 10% due to better vaccination coverage in HCWs in developed countries.[4, 7]

Internationally, HBV infection as a major occupational hazard of HCWs and vaccination coverage against HBV has received a good literature attention. In Pakistan, few small single center based studies have been conducted but the overall scarcity of data on this very important topic warrants more in-depth research to improve our level of understanding, help identify common barriers to vaccination and thus, highlight the subject. This study aimed to determine the frequency of vaccination coverage against HBV in HCWs in tertiary care hospitals and to identify the common barriers to vaccination.

MATERIALS AND METHODS

This descriptive cross sectional study was conducted from January 2018 to May 2018, at ten tertiary care teaching hospitals of Pakistan. Fourteen hundred HCWs were selected through convenient sampling, invited to participate in the study; aims of the study explained and informed written consent taken. A self-administered, pre-tested questionnaire was used, which included questions about demographics, HBV vaccination status and reasons for non-vaccination or incomplete vaccination. Ethical approval was obtained from the Ethical Review Board of Military Hospital Rawalpindi Pakistan.

Participants who received ≥3 doses of vaccine were defined as vaccinated; those who did not receive any dose were defined as non-vaccinated. Those who received one or two doses but did not complete full course of three doses were defined as partially vaccinated. Collected data was coded, entered, and analyzed using SPSS version 22.0. Descriptive statistics were used for categorical variables and Chi square test to discover association between vaccination coverage and other variables. Variables with p-value of less than 0.05 were declared as statistically significant.

RESULTS

Fourteen hundred HCWs were invited to participate in the study but only twelve hundred HCWs responded, giving response rate of 85.7%. Additional 70 participants were dropped from the study due to incomplete information and finally eleven hundred and thirty HCWs (1130) were enrolled in the study. Of the total, 693 (61.3%) were males and the mean age was 28.8 years (± 6.69 SD years, range from 17-66). The mean duration of employment was 28.5months (range 1-444 months). Doctors contributed maximally (60.9%) to the sample size followed by nurses. The demographic characteristic and profession-wise breakup of the participants is presented in Table 1.

Table No.1: General Characteristics of the Health Care Workers (n = 1130)

Variable	Frequency(%)
Gender	
Male	693(61.3)
Female	437(38.7)
Age group (years)	
Mean ±SD (28.81 ± 6.69)	
< 20	15 (1.3)
21–30	840 (74.3)
31–40	207 (18.3)
> 40	68 (6.1)
Profession	
Doctor	688 (60.9)
Nurse	259 (22.9)
Technicians	78 (6.90)
Assistants	62(5.50)
Others	43(3.80)
Duration of employment (years)	
Mean (5.04 ± 6.32SD)	
<1	209(18.50)
1-5	611(54.10)
6-10	170(15.00)
11-15	60(5.30)
>15	80(7.10)

Table 2: Cross tabulation of factors associated with complete Vaccination of the health care workers

Variable	Complete vaccination (Number and Percentage)	Chi square value	*p* value
Gender			
Male	352 / 693 (50.79)	5.09	(0.165)
Female	238 / 437 (54.46)		
Age group (years)			
< 20	2 / 15 (13.33)		
21–30	428 / 840 (50.95)	23.38	(0.025)
31–40	114 / 207 (55.07)		
> 40	46 / 68 (67.65)		
Profession			
Doctor	422/688 (61.37)		
Nurse	114/259 (44.02)		
Technicians	23 / 78 (29.49)	113.10	(<0.001)
Others	18 / 62 (29.03)		
Assistants	13 / 43 (30.23)		
Duration of employment (in years)			
<1	103 / 209 (49.28)		
1-5	321 / 611 (52.54)	26.32	(0.035)
6-10	47 / 80 (58.75)		
11-15	28 / 60 (46.67)		
>15	91 / 170 (53.53)		

Of the total, 590 (52.2%) HCWs were fully vaccinated, 188 (16.6%) partially vaccinated, 307 (27.2%) non vaccinated and 45(4%) could not recall their vaccination history, as presented in figure 1. Complete vaccination coverage was higher in females compared to males (54.46% vs. 50.79%) but this difference was not statistically significant (p=0.165). The vaccine uptake increased with increasing age and increased duration of employment ($p < 0.05$). The vaccine uptake was higher in higher clinical profession (increased from 29.03% among assistants to 61.37% among doctors). The association of complete vaccination coverage with variables like age, gender, duration of employment and type of profession is presented in table 2. Of the fully vaccinated HCWs, only 122 (16.3%) had checked their post vaccination anti HBs antibodies titers to assess post vaccination immune response.

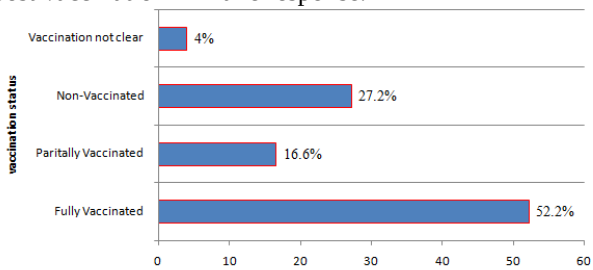

Figure No.1: Graphical representation of vaccine coverage in health care workers

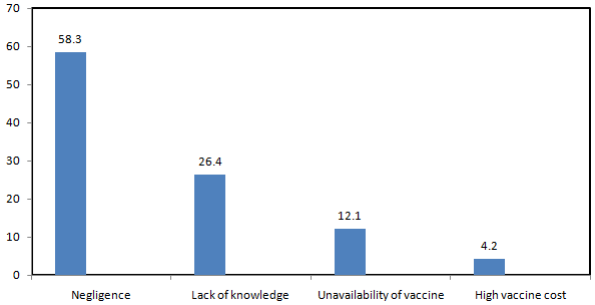

Figure No.2: Reasons for Non vaccination in health care workers

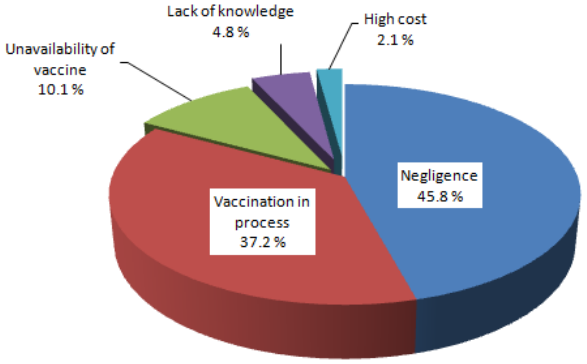

Figure No.3: Reasons for Incomplete vaccination in health care workers

The most common reason reported for not being vaccinated was negligence (58.3%) followed by lack of knowledge (25.4%), unavailability of the vaccine (12.1%) and high cost (4.2%) as represented in figure 2. Common reasons reported for incomplete vaccination were negligence (45.8%), vaccination in process (37.2%), unavailability of vaccine (10.1%), lack of awareness (4.8%) and high cost (2.1%).

DISCUSSION

In the current study, we observed low hepatitis B vaccination coverage (52.2%) in HCWs. Previous studies from different regions of Pakistan have reported different vaccination rates ranging from 37.2% to 66.3%. [7-12] A vaccination rate of 52.2% is consistent with the findings of Abdul Rauf et al who reported a vaccination rate of 52% from Karachi and partially tallies with the findings of Shrestha et al who reported a vaccination rate of 48% among HCWs.[13, 14] A study by Ali NS et al from Agha Khan University (AKU) hospital Karachi in 2005 however; showed much higher rates of complete vaccination (86%) in HCWs.[15] Such a higher vaccination rate may be explained by the fact that AKU is private and largest hospital of the country where hospital provides free vaccine and follows standard rules and regulations. Nevertheless, this gap in vaccination coverage in institutional setting is disappointing as vaccination rate should have increased over a period of thirteen years in parallel with the increasing awareness about the problem over time. Similarly, Vaswani et al from Karachi reported higher complete vaccination rate of 62.8%.[16] This coincidence may be partially explained by higher public awareness about HBV in Karachi or perhaps better institutional standards in Karachi. Memon et al reported complete vaccination of 42.47% among HCWs. In the same study 21.34% were partially vaccinated and 36% not vaccinated at all. [17]

Globally, the statistics about HBV vaccination rate are highly variable and in part conflicting. Studies from Cameron, Uganda, Ethiopia, Tanzania and Iraq, reported rates of complete vaccination coverage, 5.5%, 6.2%, 28.7%, 33.6%, 45%which are lower in comparison with our results.[18-22] On the other hand, studies from Saudi Arabia and Libya have shown higher vaccination rates of 63.3% and 72% respectively.[23-24] Such a gross difference in vaccination rates across these countries may reflect different levels of economic and political stability in the countries.

The most frequent reason reported for not being vaccinated was negligence (58.3%) followed by lack of knowledge (25.4%), unavailability of the vaccine (12.1%) and high cost (4.2%). There is some uniformity and consistency in this connection with other local studies.[15-17] Khan et al reported work pressure, negligence and high cost of the vaccine as major hurdles to vaccination.[4] Negligence as a main barrier against vaccination was also reported by a study from Agha Khan University and two studies from Hyderabad medical universities.[15,17] Vaswani et al reported

unavailability of free vaccine followed by ignorance as the most frequent reasons for not receiving or discontinuing vaccination.[16] Some studies have reported high cost as the main reason cited for not receiving vaccination, followed by the non-availability of the vaccine.[9, 15] Few reported fear of injection and uncertainty about the efficacy and safety of the vaccine as additional causes for non-vaccination.[9]

In our study we observed higher vaccine uptake with increasing age and higher clinical profession. Increased vaccine uptake with advancing age and profession may indicate increasing awareness about the disease and in part, increasing self-care and economic stability with advancing age and professional grade. The highest vaccination rate was seen in doctors (61.37%) followed by nurses (44.02%), technicians (29.49%) and least in assistants (29.03%). Almost similar results of vaccination rates in different professions were reported in different studies.[14, 16]Current study showed increased vaccine uptake with increasing duration of employment which may reflect increased awareness regarding HBV and vaccination in hospital staff.

The centers for disease control and prevention (CDC) recommend post vaccination antibody (Anti-HBsAb) testing in HCWs, 1-2 months after completing 3 dose regimen of hepatitis B vaccination. If immune response is not adequate (defined by Anti-HBsAb < 10 IU/ml), the 3 dose series needs to be repeated and antibodies rechecked thereafter. If there is no immune response after second course, no further vaccination is recommended and they are considered vaccine non responders.[23] In this study we observed poor compliance with the recommendations of post vaccination serologic testing as only 16.3% had checked their post vaccination antibodies titers. Few local studies have reported comparable results of compliance with post vaccination serologic testing in HCWs, 18% reported by Vaswani et al [16]from Karachi, 11.5% reported by Younus et al [25] from Lahore and 19% in a study from Agha Khan University[15]. Again, one may safely speculate about such a poor trend in common to be attributable to the afore-mentioned reasons for non-vaccination like negligence, lack of awareness and perhaps economy reasons. A study from the Saudi Arabia reported that only 10% of the HCWs had checked their post vaccination antibodies.[26]

CONCLUSION

A sizeable proportion of HCWs are not vaccinated. Such a low rate (52.2%)of vaccination in well informed, knowledgeable segment of general population may reflect an even worse situation in the general population. The most common reason reported for non-vaccination is negligence followed by lack of knowledge, perceived high vaccine cost and non-availability of the vaccine. Compliance with post vaccination antibodies testing is even worse. To achieve 100% vaccination coverage in HCWs, government should implement a mandatory and free immunization program for all the medical students and HCWs right at the time of admission in medical school and before employment. This program should also make sure post vaccination follow up with antibodies testing.

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Author's Contribution:

Concept & Design of Study:	Muhammad Asif
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Revisiting Critically:	Muhammad Asif, Muhammad Zahid
Final Approval of version:	Muhammad Asif

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