

## Research Article

# Frequency of Hepatitis-B Vaccination in Health Care Workers and the Reasons for Being Unvaccinated

Saad Sohail<sup>1</sup>, Ali Nauman Khan<sup>2</sup>, Malik Qistas Ahmad<sup>3\*</sup>, Fariha Ashraf<sup>4</sup>, and Muhammad Arsalan Arshad<sup>5</sup>

<sup>1</sup>Department of Internal Medicine, Allama Iqbal Medical College, Pakistan

<sup>2</sup>Department of Internal Medicine, Ameer ud Din Medical College, Pakistan

<sup>3</sup>Department of Internal Medicine, King Edward Medical University, Pakistan

<sup>4</sup>Department of Internal Medicine, Jinnah Sindh Medical University, Pakistan

<sup>5</sup>Department of Internal Medicine, Army Medical College, Pakistan

**\*Corresponding author**

Malik Qistas Ahmad, Department of Internal Medicine, King Edward Medical University, Lahore, Pakistan, Tel: 15208958400; Email: kistasmalic@yahoo.com

Submitted: 10 June 2018

Accepted: 19 June 2018

Published: 22 June 2018

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**OPEN ACCESS****Keywords**

- Hepatitis
- Health care workers
- Vaccination
- Immunization
- Infection
- Health education
- Acute
- Chronic

**Abstract**

Worldwide, hepatitis B virus (HBV) is the most common among those hepatitis viruses that cause acute and chronic infections of the liver in humans, and it represents a global public health problem.

**Study design:** Cross Sectional Study.

**Place and duration of study:** Lahore General Hospital. 2 months.

**Objective:** Our aim was to find out the frequency of individuals vaccinated against Hepatitis B among healthcare workers, and to determine the causes of lack of immunization.

**Methods:** A structured questionnaire was distributed randomly between April 15, 2016 and May 30, 2016 to the HCWs of LGH. These included Physicians, Surgeons, House Officers, Residents, Nurses and Technicians. The completed questionnaires were analyzed using the software Statistical Package for Social Sciences (version 10).

**Results:** The main outcome measure was vaccination status and reasons for non-vaccination. 63% of HCWs were vaccinated against Hepatitis B. The main reasons for non-vaccination were; the belief amongst participants that they were not at risk (54.7%), and not getting the opportunity (31.8%).

**Conclusion:** Since a vast majority of participants were unaware that they are at risk of getting infected, efforts should be made to impart appropriate health education regarding hepatitis B infection and vaccination.

**ABBREVIATIONS**

HCWs: Healthcare Workers; LGH: Lahore General Hospital; HBV: Hepatitis B Virus; HCC: Hepatocellular Carcinoma; IDU: Injection Drug Users

**INTRODUCTION**

Worldwide, hepatitis B virus (HBV) is the most common among those hepatitis viruses that cause acute and chronic infections of the liver in humans, and it represents a global public health problem. Chronic hepatitis caused by HBV is the major cause of hepatocellular carcinoma (HCC) [1]. It is estimated that HBV will infect more than 2 billion people alive today at some point in their lives. About 80% of all chronic carriers live in Asia and Western Pacific Rim Regions, where prevalence of chronic Hepatitis B is more than 10% [2]. Hepatitis B is endemic throughout the world especially in tropical and developing countries. 350 million people are chronic carriers of HBV [3].

Several risk factors have been identified by various studies in Pakistan. Needles in healthcare settings, recipients of blood and blood products, injection drug users (IDUs), occupational risks like healthcare workers (HCW), barbers and household contact/spousal transmission have been established as major risk factors. Injections in healthcare settings have been well described in the literature as a major mode of transmission of HBV and HCV in developing countries [4]. Immunization with hepatitis B vaccine is the most effective means of preventing hepatitis B infection and its consequences. The recommended strategy for preventing this infection is selective vaccination of persons with identifiable risk factors. However, this strategy has not lowered the incidence of hepatitis B, primarily because vaccinating those persons engaged in high-risk behaviors, life-styles, or occupations before they become infected generally has not been feasible. In addition, many infected persons have no identifiable source for their infections and thus cannot be targeted for vaccination [5]. Hepatitis B Vaccine is a recombinant hepatitis B vaccine and needs adjuvant.

It is available as monovalent or in fixed combination with DPT, Hib, Hepatitis A and inactivated polio. The dose for adults is 10-20 micrograms initially (depending on the formulation) and again at 1 and 6 months. Deltoid muscle is preferred for injection for greatest reliability of absorption. Alternatively, a four-dose schedule may be used where the dose at birth is followed by three additional doses at 6, 10 and 14 weeks with DPT vaccinations [3]. The prevalence of HBsAg positivity among Pakistani health workers has been studied previously. Studies in healthcare workers showed relatively higher rates of HBV (6% weighted average, range 0-10.3%) and HCV (5.5% weighted average, range 4.0-5.9%) than in the general population [4]. Annual incidence of HBV infection in surgeons is estimated to be 50 times greater than that in the general population, and is more than twice that of other physicians [3]. However, not many studies have been undertaken to determine the vaccination coverage levels among healthcare workers in Pakistan. This study assessed not only the vaccination status of HCWs of Lahore General Hospital, but also ascertained the reasons for non-vaccination.

## MATERIALS AND METHODS

Descriptive, Cross Sectional Study

**Study duration:** 2 months

**Study settings:** Lahore General Hospital.

**Sample size:** The sample size was calculated using the Cochran Formula i.e.

$$N = Z^2pq/d^2$$

Where,

**N** is the sample size

**Z** has a value of 1.96 for 95% level of confidence,

**p** is estimated Hepatitis B vaccination rate taken to be 0.5,

**q** is 1-p that is 0.5,

**d** is the margin of error with a value of 0.09.

*Substituting for the variables:*

$$N = (1.96)^2 \times 0.5 (1-0.5) / 0.09^2$$

$$N = 118.6$$

So,

$$\text{Sample Size} = 119$$

## Data collection procedure

A structured questionnaire was distributed randomly to the HCWs of LGH. These included Physicians, Surgeons, House Officers, Residents, Nurses and Technicians.

## Data analysis plan

The completed questionnaires were analyzed using the software Statistical Package for Social Sciences, version 19. The data was presented using Tables, Pie Charts, and Bar Charts etc. The statistical significance was tested using the Chi Square Test. A p value <0.05 was considered significant.

## Ethical consideration

Informed consent was taken. Anonymity of the respondents was ensured. Collected data remained confidential throughout the study.

## RESULTS

The study population belonged to different age groups. We divided them into 4 categories. 25.2% were less than 25 years old. Majority of the subjects (52.9%) belonged to the 25-34 years age group. While 10% were 35-44 years old and 11.9% of the subjects were older than 44 years. From a total of 119, 55 (46.2%) of our subjects were males, while 64 (53.8%) were females. We also categorized our subjects according to their work type. The categories included Surgeons (3.3%), Physicians (10.7%), Residents (14.1%), House Officers (15.9%), Nurses (39.5%) and Technicians (16.5%).

The demographic characteristics of the study population are shown in Tables 1-3.

The main aim of the study was to assess the vaccination status of the Healthcare workers at Lahore General Hospital. Through our study, it was found that out of 119 subjects, only 75 were vaccinated (63%), while 44 were non-vaccinated (37%). Among the HCWs, the highest percentage of vaccination was seen in surgeons (100%), and the second highest was seen in Physicians (92.3%). Out of 19 House Officers, 16 were vaccinated i.e. 84.3%. Majority of the study population comprised of Nurses. Only 24 out of them were vaccinated against Hepatitis B, the percentage came out to be 52.2%. The lowest frequency of vaccination was seen in Laboratory technicians. Only 7 out of 20 (35%) confirmed to have had received Hepatitis B vaccine.

According to the age categories, 50% of the subjects who belonged to <25 years of age group claimed to have received the

**Table 1:** Age groups of study population.

	Characteristics	Frequency	Percentage
Age	<25	30	25.20%
	25-34	63	52.90%
	35-44	12	10%
	>44	14	11.90%
	Total (n)	119	

**Table 2:** Gender distribution of study population.

	Characteristics	Number	Percentage
Sex	Male	55	46.20%
	Female	64	53.80%
	Total (n)	119	

**Table 3:** Relative work type of study population.

	Characteristics	Frequency	Percentage
Work Type	Surgeon	4	3.30%
	Physician	13	10.70%
	Resident	17	14.10%
	House Officer	19	15.90%
	Nurse	46	39.50%
	Technician	20	16.50%
	Total (n)	119	

complete course of Hepatitis B vaccine, while 65% of the subjects from the 25-34 year category were vaccinated. In the age group 35-44, a higher frequency of vaccination was seen i.e. 66.7%, whilst the highest occurrence (78.5%) was observed in the older age group i.e. >44 years of age. Therefore an increasing trend in frequency of vaccination was seen with an increasing age, as is clear from the data (Tables 4 and 5).

Our research was aimed not only to find the proportion of healthcare workers at Lahore General Hospital that was vaccinated against HBV but it was also intended to determine the reasons for the absence of immunization. This information was also collected via the questionnaire as non immunized persons had to give reasons for their immunization status. 6 appropriate reasons were considered as causes for non-vaccination in the questionnaire. The results of this task were compiled and are displayed in Table 6 (This data is also represented graphically).

In Table 6, it can be seen that the main reason for non-immunization in HCWs of LGH was that they did not consider the vaccine necessary or that they did not believe themselves to be at risk of getting infected. In spite of their chosen field of work, a shockingly high, 54.7%, of the 44 non immunized hospital personnel claimed this to be their rationale.

Moreover, 31.8% declared that they did not get the opportunity to get vaccinated even though they work in a hospital. Apart from this it turned out that that 9.1% were not aware of the fact that a vaccine against HBV had been developed.

Furthermore, 2.2% deemed the vaccine to be a too costly protective measure while another 2.2% expressed the fear and danger of the vaccine itself causing the disease it is supposed to protect against. It should also be noted that none of the HCWs attributed their lack of vaccination to any religious reservations on their part.

Moving on, for a better analysis, using the results of our study conducted at LGH, we also decided to compare the vaccination status of HCWs of Pakistan to those of other countries as is shown in Table 6. From the table it can be seen that USA's vaccination status of nurses, being 75%, is higher than that of the nurses in Pakistan today even back in 1997. In comparison, only 55% of the nurses were vaccinated at LGH even 19 years from then, in 2016. On the other hand, the vaccination status of surgeons in LGH is 100% while 79.5% of surgeons were vaccinated in UK. Having said that, it should be kept in mind the lower value of 79.5%, back in 1997.

Table 6 also shows the vaccination status of Pakistan back in

**Table 4:** Vaccination status in terms of age group among study population.

Study Population		Vaccinated		Non vaccinated	
		Frequency	Percentage	Frequency	Percentage
Age Group	<25	15	50%	15	50%
	25-34	41	65%	22	35%
	35-44	8	66.70%	4	33.30%
	>44	11	78.50%		21.50%

**Table 5:** Reasons for non-vaccination.

Reasons	Frequency (n=44)	Percentage
Did not consider it necessary/at risk	24	0.547
Did not get the opportunity	14	0.318
Vaccination too costly	1	0.022
Danger of vaccine itself causing the disease	1	0.022
Religious reservations	-	-
Did not know that vaccine exists	4	0.091

**Table 6:** Comparison of vaccination status of HCWs of various countries.

Country	Year	Vaccination Status		Reference
		Category	Prevalence (%)	
Pakistan	2016	HCWs	63.2	Present study
	1998	ORP*	36	
U.S.A	1997	Nurses	75	12
		Pathologists	75	12
		Paramedics	78	13
		Gynecologists	51.9	24
U.K.	1997	Pathologists	40	24
		Surgeons	79.5	14
		ERP**	88	15
Portugal	1999	HCWs***	57	16

\*ORP= Operating Room Personnel  
\*\*ERP= Emergency Room Personnel  
\*\*\*HCW=Health Care Worker

1998. This was extremely low with a percentage of 36.0. To be more precise, this percentage is lowest in the table with Portugal, a developing country as well, having 57% percent of its HCWs vaccinated against HBV. Therefore, the difference in vaccination status of Pakistan in 1998 and 2016 is quite appreciable with it rising to 63.2%. However, there is still room for massive improvement especially when compared to the vaccination status of the developed countries.

## DISCUSSION

The sero-prevalence of Hepatitis B among various groups of Pakistani population is estimated to be around 3% [6-10]. The prevalence of HBsAg positivity among Pakistani health workers ranges from 5.2% among subjects studied by Zahid et al.,<sup>6</sup> in 1991 to 7.5% among 114 operating room personnel examined by Mujeeb et al. [11], in 1998. The vaccination status of Pakistani HCWs is lower than the figures reported from USA [12,13] (40-78%) and UK [14,15] (79-88%). A report from the University of California at Los Angeles [16], Los Angeles, USA, also shows that only 40% of Pathologists and 51.9% of the Gynecologists were vaccinated (Table 4).

The most common reason (54.7%) for non-vaccination was the belief that they weren't at risk of acquiring hepatitis B, while 31.8% stated that they did not get the opportunity. Moreover, the results show that the highest proportion of individuals vaccinated that is 80% was in the >44 age group. This leads to the inference that with increasing age and hence experience HCWs are more aware of the risk the virus poses to them especially due to their work setting.

In Pakistan, there is no medical insurance and most hospitals do not bear the cost of vaccination of their staff. Due to the high cost of vaccination, most HCW do not get vaccinated for it. The fact that 9.1% of the HCWs declared that they were not aware of the existence of Hepatitis B vaccination indicates that reforms in the health education program are needed.

## CONCLUSION

Despite vaccination being provided at no cost and administered in the workplace, an estimated one third of HCWs who have frequent or potential exposure to blood or other potentially infectious material remain unvaccinated. We tried to determine the reasons for refusing vaccination and we believe more efforts should be made to increase hepatitis B vaccination coverage levels among all HCWs, especially those at greatest risk for exposure to blood or other potentially infectious material. Hospitals also need to identify successful vaccination strategies focused on exposed, but unvaccinated, HCWs.

## ACKNOWLEDGEMENTS

I would like to thank the staff at LGH who participated in

this research and completed the questionnaires. The guidance provided by the Community Medicine Department at Ameer ud Din Medical College; particularly Dr. Syed Razi Haider Zaidi, Head of Community Medicine Department, AMC/PGMI, Lahore, and the research supervisor Dr. Tabinda Saleem; in developing and carrying out the research project is highly appreciated.

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### Cite this article

Sohail S, Khan AN, Ahmad MQ, Ashraf F, Arshad M (2018) Frequency of Hepatitis-B Vaccination in Health Care Workers and the Reasons for Being Unvaccinated. *JSM Hepat* 3(1): 1011.