

ASSESSMENT OF VACCINATION COVERAGE AND AWARENESS OF HEPATITIS B AMONG HEALTH CARE WORKERS IN TERTIARY CARE HOSPITALS IN BANGALORE

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Abstract

Background: The burden of Hepatitis B is increasing worldwide causing silent epidemic. With advent of development of effective vaccine against Hepatitis B, the disease burden can be reduced. The awareness about the disease and proper vaccination can bring protection especially to high-risk groups like healthcare workers. With this the study was conducted to assess the Vaccination coverage and awareness about Hepatitis B disease transmission and vaccination among healthcare workers at their workplace. The objectives of the study were to assess the Hepatitis B vaccination coverage and their Knowledge and Practice about Hepatitis B infection and vaccination among Health Care Workers in the tertiary care hospital in Bangalore. **Materials and Methods:** A cross sectional study was carried out for a period of 18 months among randomly selected 425 Health care workers in the tertiary care hospital in Bangalore. A pre designed semi structured questionnaire was used to collect data from different strata of healthcare workers including Nurses, technicians, Group D and Housekeeping. Data entered in MS excel and analysed using SPSS version 23.0. Chi square test, Fisher's exact test, independent t test, spearman correlation were used for finding association. **Result:** Overall vaccination coverage was 38.8% with 34.8% fully vaccinated and 4% were partially vaccinated. 70.8% of nurses, 51.4% of technicians, 2% of Group D workers and 1% of Housekeeping were vaccinated. 81.8% of nurses and 40.5% of technicians had good knowledge. There were significant association of occupation with knowledge and vaccination. **Conclusion:** Awareness and vaccination are less among Health care support workers. Study highlighted the need for regular training sessions for healthcare workers regarding the occupational risk and also mandatory Hepatitis B vaccination for all Health Care Workers.

INTRODUCTION

Hepatitis B caused by Hepatitis B virus (HBV), a potentially life threatening highly contagious infectious disease is a global health problem resulting in large number of morbidity and mortality due to acute and chronic hepatitis, liver cirrhosis and hepatocellular carcinoma.^[1] Globally more than 2 billion people worldwide have evidence of past or current HBV infection. An estimated 296 million people are living with chronic infection of the virus,^[2] which is harboured in the liver and causes approximately 820,000 deaths due to complications of HBV mostly from cirrhosis and liver cancer due to

chronic hepatitis B infection.^[3] An estimated 57% of cases of liver cirrhosis and 78% of cases of primary liver cancer result from hepatitis B or C virus infection.^[2] India has over 40 million HBV carriers and accounts for 10–15% of the entire pool of HBV carriers of the world contributing to around 100,000 deaths due to illnesses related to HBV infection in India.^[4]

Healthcare workers (HCWs) including both health care professionals and healthcare support workers are directly involved in providing care to all patients; consequently, at high risk of infection with life threatening blood borne infections like Human Immunodeficiency Virus, Hepatitis B Virus and

hepatitis C virus (HCV) and more.^[5] Thus, they are at high risk of occupational risk to exposure to these infections either through percutaneous injury (Needle stick Injury and other sharp metals), mucocutaneous injury such as splash of blood or other body fluids into the eyes, nose or mouth or through blood contact with non-intact skin or mucous membrane. Healthcare professionals working with these products are at high risk especially those at operating theatres, blood banks, laboratories, delivery room and also the healthcare support workers such as cleaners and waste collectors involved in handling the infectious wastes.^[6] Hepatitis B being one of the preventable disease is 100 times more infectious than Human Immuno deficiency Virus.^[7] Even 0.00001 ml of blood infected with Hepatitis B can transmit the disease.^[8] Hepatitis B virus can survive outside the body in environment for about 7 days; causes infection when it enters the uninfected during this time. A protective vaccine with a reported efficacy of 95% is available since 1982. It is the first vaccine developed to prevent human cancer. To fully vaccinated individuals it provides immunity for upto 20 years or lifelong.^[9]

Objectives

The objectives of the study were to assess the Hepatitis B vaccination coverage and their Knowledge and Practice about Hepatitis B infection and vaccination among Health Care Workers in the tertiary care hospital in Bangalore.

MATERIALS AND METHODS

A cross sectional study was conducted in five tertiary care hospitals in Bangalore. The study period was for a period of 18 months. All permanent Healthcare workers including Health care professional and healthcare support workers - Nursing Staff, Technicians (Lab, Blood Bank, OT), Housekeeping and Group D workers were included. Doctors and medical students, those not consented for study and those not available for 3 visits were excluded from the study.

The sample size was calculated based on previous study by Joshi et al,^[10] in Uttarakhand, the prevalence of complete vaccination among health care workers was 48.5%. Sample size was calculated using the formula, $n = 4pq/d^2$ with a prevalence of 48.5% and allowable error of 10%.

A universal sampling frame of list of Permanent workers in each stratum [Healthcare professional (Nursing staffs), Healthcare support workers (Technicians, House Keeping, Group D Workers)] was obtained and to have equal representation from each hospital, probability proportion to sample size technique was adapted and 44.7% of the workers from each stratum were chosen from each hospital. In that individuals were selected using systematic random sampling technique where every alternate person in the attendance were chosen. Hence 203 nurses, 37 technicians (OT/Lab/Blood Bank), 84

Housekeeping and 101 Group D workers were included in the study. Those who didn't give consent and those who could not be contacted even after 3 visits were excluded and the next alternate person was chosen.

Ethical clearance was obtained and informed written consent was obtained from all the participants. Confidentiality of the participants were maintained. The details were collected using a pretested, semi structured, self-designed, interviewer administered questionnaire. The questionnaire consisted of four sections- Sociodemographic details, knowledge-based questions, attitude-based questions and vaccination status. The filled questionnaires were collected on the same day after 30 mins. As majority in Housekeeping and Group D workers were found illiterate, so data were collected from them in a similar manner but through interview-based technique.

After collecting data from the individuals, health education was given to all the workers immediately and individually. All the healthcare workers were eventually vaccinated with complete 3 dose of Vaccination in the institution itself. 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 (Good, average, poor) on the basis of their knowledge.

Completely Vaccinated refers to those who took all three doses of Hepatitis B vaccination. Partially Vaccinated refers to those who took one or two doses of Hepatitis B vaccination at any point of their life. Not Immunized have not taken even one doses of Hepatitis B Vaccination.

The data was entered in MS Excel and was analysed using SPSS version 16. Both descriptive and inferential statistics were used. Chi square test, independent t test, fisher's exact test was used for finding association between KAP and socio demographic profile. Spearman correlation was used for finding strength of association between knowledge and vaccination. p value < 0.05 was considered significant. Linear regression was used for finding the magnitude of association between years of experience and knowledge. Data was presented in the form of tables, figures, graphs, wherever necessary.

RESULTS

Among the study participants, 95 (22.4%) were male and 330 (77.6%) were females. 150 participants (35.3%) were from 21 to 30 years of age, 128 (30.1%) were from 31 to 40 years of age, 93 (21.9%) were from 41 to 50 years of age, 54 (12.7%) were from 51 to 60 years of age. 132 participants (31.1%) had 1 to 5 years of experience, 190 participants (44.7%) had 6 to 10 years of experience, 45 (10.6%) had 11 to 15 years of experience, 13 (3.1%) had 16 to 20 years of

experience, 17 (4%) had 21 to 25 years of experience, 16 (3.8%) had 26 to 30 years of experience and 12 (2.8%) had 31 to 35 years of experience. 88 participants (20.7%) were illiterate, 13 (3.1%) studied upto primary school, 27 (6.4%) upto middle school, 49 (11.5%) studied upto high school, 163 (38.4%) upto intermediate and 85 (20%) were graduates. 101 participants (23.8%) were lower middle socioeconomic status, 125 (29.4%) were middle status, 156 (36.7%) were upper middle and 43 (10.1%) were upper socioeconomic status. Details for each stratum is also given in [Table 1].

With respect to department of work of the study participants, 12.9% (55) were working in emergency, 11.8% (50) in Outpatient department, 1.2% (5) in delivery room, 15.3% (65) in operation theatre, 51.1% (217) in ward, 6.1% (26) in Laboratory and 1.6% (7) in Blood bank.

Among 425 participants, 38.8% (165) reported as vaccinated with 34.80% (148) being completely vaccinated and 4% (17) partially vaccinated with 2.6% (11) had taken 2 doses and 1.4% (6) had taken one dose and the rest 61.2% (260) were unvaccinated. 70.4% (163) of nurses and 51.4% (19) of technicians were vaccinated and 2% (2) of group D and 1.10% (1) of housekeeping were vaccinated. 47.5% of males were vaccinated and 36.4% of females were vaccinated. [Figure 1]

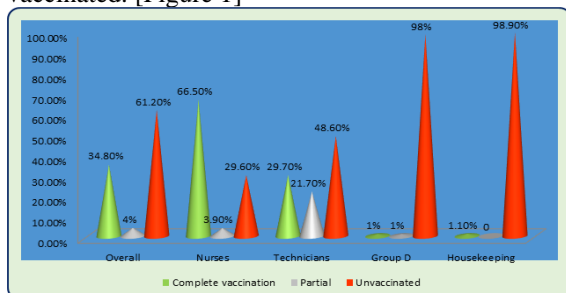


Figure 1: Vaccination status of Health care workers

Knowledge about transmission of Hepatitis B and Vaccine: Among the study participants, 42.8% (182) had good knowledge, 14.1% (60) had average knowledge and 43.1% (183) had poor knowledge. About disease transmission, 35.8% (152) had good knowledge, 19.3% (82) had average knowledge and 44.9% (191) had poor knowledge. Regarding disease prevention and vaccination 41.6% (177) had good knowledge, 15.1% (64) had average and 43.3% (184) had poor knowledge. [Figure 2]

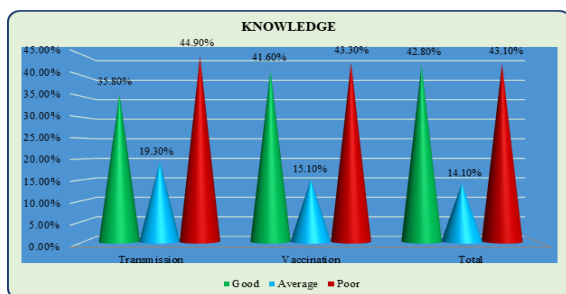


Figure 2: Knowledge about Hepatitis B transmission and vaccination among all healthcare workers

Overall, 42.8% had good knowledge, with 81.80% of nurses, 40.5% of technicians % 1% of Group D workers and none of the Housekeeping had good knowledge. [Figure 3]

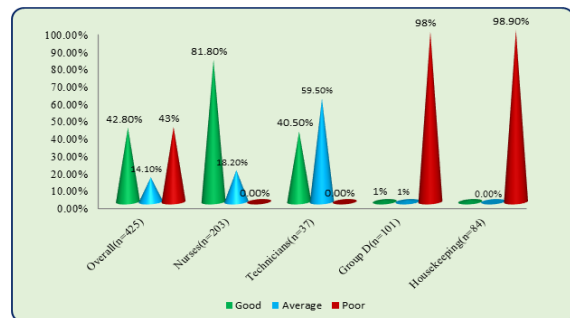


Figure 3: Knowledge among health care workers

With respect to occupation, among nurses, 81.8% had good knowledge, among technicians, 40.5% had good knowledge, among group D workers, 1% had good knowledge and among housekeeping, none had good knowledge. This difference was statistically significant by chi square test. ($p < 0.05$) With respect to socioeconomic status, among upper class, 86% had good knowledge, among upper middle class, 75% had good knowledge, among middle class, 22.4% had good knowledge and among lower middle class, 98% had good knowledge. This difference was statistically significant by chi square test. ($p < 0.05$). [Table 2]

Among males, 47.4% were vaccinated and among females, 36.4% were vaccinated. With respect to occupation, among nurses, 70.4% were vaccinated, among technicians, 51.4% were vaccinated, among group D workers, 2% were vaccinated and among housekeeping, 1.1% were vaccinated. This difference was statistically significant by Chi square test. ($p < 0.05$). Similarly with education, among those illiterates and primary school education, none were vaccinated and 67.1% of graduates were vaccinated ($p < 0.05$). Similarly significant association was observed between socio economic status and years of experience, vaccination status was more among those with increased years of experience. ($p < 0.05$) [Table 3].

Among those who had good knowledge, 72.5% were vaccinated. ($p < 0.05$). Among nurses, among those who had good knowledge, 72.9% ($p < 0.05$) among those technicians who had good knowledge, 73.3% were vaccinated which was statistically significant by Chi square test. ($p < 0.05$) [Table 4].

Moderate positive correlation (0.645) was observed between knowledge score and vaccination status which was statistically significant. ($p < 0.05$) With linear regression between experience and knowledge there was a significant relationship between years of experience and knowledge ($p < 0.05$, B value= 8.999) with R square value of 10.3% and every unit change in years of experience has 0.574 impact on knowledge. Linear regression between education and knowledge showed a significant relationship between education and

overall knowledge ($p < 0.001$, B value= 9.072) with R square value of 66.9% and every unit change in education has 5.83 impact on knowledge.

Table 1: Sociodemographic details of study participants

Sociodemographic details		Nurses (n = 203)	Technicians (n = 37)	Group D (n = 101)	Housekeeping (n = 84)	Total (n = 425)
Gender	Male	39 (19.2%)	28 (75.7%)	20 (19.8%)	8 (9.5%)	95 (22.4%)
	Female	164 (80.8%)	9 (24.3%)	81 (80.2%)	76 (90.5%)	330 (77.6%)
Age category (in years)	21 to 30	105 (51.7%)	19 (51.4%)	13 (12.9%)	13 (15.5%)	150 (35.3%)
	31 to 40	58 (28.6%)	10 (27%)	29 (28.7%)	31 (36.9%)	128 (30.1%)
	41 to 50	26 (12.8%)	6 (16.2%)	36 (35.6%)	25 (29.8%)	93 (21.9%)
	51 to 60	14 (6.9%)	2 (5.4%)	23 (22.8%)	15 (17.8%)	54 (12.7%)
Years of experience	1 to 5	54 (26.6%)	9 (24.3%)	36 (35.6%)	33 (32.7%)	132 (31.1%)
	6 to 10	70 (34.5%)	16 (43.2%)	58 (57.4%)	46 (45.5%)	190 (44.7%)
	11 to 15	32 (15.8%)	2 (5.4%)	7 (6.9%)	4 (4%)	45 (10.6%)
	16 to 20	9 (4.4%)	3 (8.1%)	0	1 (1%)	13 (3.1%)
	21 to 25	14 (6.9%)	3 (8.1%)	0	0	17 (4%)
	26 to 30	13 (6.4%)	3 (8.1%)	0	0	16 (3.8%)
	31 to 35	11 (5.4%)	1 (2.7%)	0	0	12 (2.8%)
	Education	Illiterate	0	0	45 (44.6%)	43 (42.6%)
Primary	0	0	6 (5.9%)	7 (6.9%)	13 (3.1%)	
Middle School	0	0	15 (14.9%)	12 (11.9%)	27 (6.4%)	
High school	0	0	28 (27.7%)	21 (20.8%)	49 (11.5%)	
Intermediate	126 (62.1%)	29 (78.4%)	7 (6.9%)	1 (1%)	163 (38.4%)	
Graduate	77 (37.9%)	8 (21.6%)	0	0	85 (20%)	
Socioeconomic status	Lower middle	0	2 (5.4%)	51 (50.5%)	48 (57.1%)	101 (23.8%)
	Middle	28 (13.8%)	11 (29.7%)	50 (49.5%)	36 (42.9%)	125 (29.4%)
	Upper middle	134 (66%)	22 (59.5%)	0	0	156 (36.7%)
	Upper	41 (20.2%)	2 (5.4%)	0	0	43 (10.1%)

Table 2: Association between sociodemographic details and knowledge among the study participants

Sociodemographic details		Knowledge			P value
		Poor (0-11)	Average (12-23)	Good (24-35)	
Age	21-30	25 (16.7%)	33 (22%)	92 (61.3%)	< 0.001*
	31-40	59 (46%)	13 (10.2%)	56 (43.8%)	
	41-50	61 (65.6%)	11 (11.8%)	21 (22.6%)	
	51-60	38 (70.3%)	3 (5.6%)	13 (24.1%)	
	Married	175 (51.1%)	38 (11.1%)	129 (37.8%)	
	Widow	1 (50%)	0	1 (50%)	
Gender	Male	27 (28.4%)	19 (20%)	49 (51.6%)	0.004*
	Female	156 (47.3%)	41 (12.4%)	133 (40.3%)	
Occupation	Nurses	0	37 (18.2%)	166 (81.8%)	< 0.001*
	Technicians	0	22 (59.5%)	15 (40.5%)	
	Group D	99 (98%)	1 (1%)	1 (1%)	
	Housekeeping	84 (100%)	0	0	
	Socio economic status	Upper	0	6 (14%)	
Upper middle	0	39 (25%)	117 (75%)		
Middle	84 (67.2%)	13 (10.4%)	28 (22.4%)		
Lower middle	99 (98%)	2 (2%)	0		
Education	Illiterate	88 (100%)	0	0	< 0.001*
	Primary	13 (100%)	0	0	
	Middle	27 (100%)	0	0	
	High	47 (96%)	1 (2%)	1 (2%)	
	Intermediate	8 (5%)	39 (24%)	116 (71%)	
	Graduate	0	20 (23.5%)	65 (76.5%)	

*- statistically significant by Chi square test

Table 3: Association between sociodemographic details and vaccination status among the study participants

Sociodemographic details		Vaccinated		P Value
		Yes	No	
Gender	Male	45 (47.4%)	50 (52.6%)	0.05
	Female	120 (36.4%)	210 (63.6%)	
Occupation	Nurses	143 (70.4%)	60 (29.6%)	< 0.001*
	Technicians	19 (51.4%)	18 (48.6%)	
	Group D	2 (2%)	99 (98%)	
	Housekeeping	1 (1.1%)	83 (98.9%)	
Education	Illiterate	0	88 (100%)	< 0.001*
	Primary	0	13 (100%)	
	Middle	1 (3.7%)	26 (96.3%)	
	High	2 (4.1%)	47 (95.9%)	

	Intermediate	105 (64.4%)	58 (35.6%)	
	Graduate	57 (67.1%)	28 (32.9%)	
Socioeconomic status	Upper	31 (72.1%)	12 (27.9%)	< 0.001*
	Upper middle	101 (64.7%)	55 (35.3%)	
	Middle	30 (24%)	95 (76%)	
	Lower Middle	3 (3%)	98 (97%)	

Table 4: Association between knowledge and vaccination status among the study participants

	Knowledge	Vaccination		P value
		Yes	No	
Overall	Poor (0-11)	2 (1.1%)	181 (98.9%)	< 0.001*
	Average (12-23)	31 (51.7%)	29 (48.3%)	
	Good (24-35)	132 (72.5%)	50 (27.5%)	
Nurses	Average (12-23)	22 (59.5%)	15 (40.5%)	0.03*
	Good (24-35)	121 (72.9%)	45 (27.1%)	
Technicians	Average (12-23)	8 (36.4%)	14 (63.6%)	0.02*
	Good (24-35)	11 (73.3%)	4 (26.7%)	
Group D	Poor (0-11)	1 (1%)	98 (99%)	0.03*
	Average (12-23)	1 (100%)	0	
	Good (24-35)	0	1 (100%)	

*- statistically significant by Chi square test

DISCUSSION

In the present study, the overall vaccination coverage was found to be 38.8% with 34% fully vaccinated and 4.8% partially vaccinated. Though the results in the present study was higher than that of the WHO region specific of 18%, (which is an extrapolated data, not truly representative of our country) it is still lower when compared with other studies done in different tertiary care centres in India.^[11] In a study by Joshi et al,^[10] in a tertiary care centre in Nainital, among 367 healthcare workers, the overall vaccination was 70.3% with 48.5% fully vaccinated and 21.8% partially vaccinated. In a study done by Singhal et al,^[12] among 446 HCWs in AIIMS, 50.2% were fully vaccinated and 6.3% were partially vaccinated and in a study by Pathak et al,^[13] in tertiary care centre in Haryana among 600 healthcare workers, the overall vaccination coverage was 60.2% with 38.8% being fully vaccinated and 21.4% partially vaccinated. And in study by Anjum et al,^[14] in a tertiary care centre in Kashmir among 2763 healthcare workers 25.76% were fully vaccinated and 23.23% were partially vaccinated.

In present study, there were difference in vaccination status among different occupation groups, 70.4% of nurses were vaccinated with 66.5% fully and 3.9% were partially vaccinated, among technicians 51.40% were vaccinated with 29.70% fully vaccinated and 21.70% partially vaccinated. Among group D only 2% were vaccinated (1% full and 1% partial) and 1.1% of housekeeping were vaccinated. This is in contrast to 51.7%, and 12% among nurses and Technicians in the study by Joshi et al.^[10] In the study by Singhal et al,^[12] in AIIMS, it was found that 77% of nurses, 65% of technicians and 25% of Group D/Laundry were vaccinated In study by Batraa et al,^[15] among 464 HCWs in Jodhpur city it was found that 62.4% of nurses, 24.2% of technicians and 0% of Group D workers were vaccinated. In a study by Sajjan et al,^[16] on awareness and Practice of Complete Hepatitis B Vaccination among the tertiary

care hospital in Vijayapura the practice of complete vaccination was 63.3% and 90% in the nursing and technical staff respectively.

In the current study males were found to be more vaccinated than females. This was in contrast to the study by Anjum et al,^[14] in Kashmir were females were more vaccinated compared to males. This difference in gender maybe due to more number of female participants in the present study compared to large number of males participants in the study by Anjum et al.^[14] There is significant difference with those in upper and upper middle Socio economic status, Graduates and intermediate/diploma education, those with more experience and nurses and technicians were found to be vaccinated compared to lower SES class, Illiterates, group D & Housekeeping. This attributes to the literacy level in different occupation group. This was similar to a study by Ayalew et al,^[17] in Ethiopia were first degree and master degree holders, medical doctors, and pharmacists had better vaccination status than others. There is also significant association with vaccination and age in the present study, where majority of younger groups (21-30 years) were reported to be vaccinated in the present study, which was similar to the study by Anjum et al^[14] in Kashmir, were a greater number of those <30 years were found to have vaccinated. This major disparity in vaccination status among different occupation groups in our study can be attributed to level of awareness about the disease transmission and vaccination against the disease.

Regarding knowledge, 57.6% had knowledge about disease transmission and prevention with the median score of 21. 42.8% had good knowledge. 81.8% of nurses, 40.5% of technicians and 1% of housekeeping and group D had good knowledge. Almost more than 95% of the Group D and Housekeeping workers have not heard about the disease itself. In a study by Debbarma et al,^[18] in New Delhi it was reported that 18% of nurses and 4% of technicians had adequate knowledge with 36% and 22% had fairly adequate knowledge. In a study by Abiola et al,^[19] in Lagos

city, 70.2% had good knowledge about Hepatitis B infection and vaccination.

In the present study there were significant association between the sociodemographic profile and knowledge. Overall factors such as younger age category (21-30 years), Gender (males), years of experience, Literacy (graduates), socio economic status were found to have significant association. However, this association is mainly attributed to the occupation, where nurses and technicians had good knowledge compared to certain groups such as Group D and Housekeeping who lacks adequate knowledge. In the former groups majority belongs to 21-30 years, graduates belonging to upper socio-economic status were found to have good knowledge in contrary to the latter group, Housekeeping and Group D workers who lack knowledge majority belongs to low literacy level belonging to lower Socioeconomic class, and 30-40 years contributing to significant difference in overall knowledge. However, the study by Afihene et al,^[20] in Ghana reported association between KAP score and age, occupation and years of experience. Similarly, the difference in the vaccination status among different groups in the present study can be attributed to the education status, occupation and Knowledge. There is also significant association with gender and knowledge, gender and vaccination. This again can be attributed to occupation where majority of nurses, group D and Housekeeping were females. There were also significant association with knowledge and vaccination among Technicians and Group D workers and also with Housekeeping where almost negligible number had knowledge. This attributes to the fact that awareness generation through training sessions plays significant role in the practice.

The limitations of the study include the results of the present study may not be generalizable to other health care workers present in other hospitals in other parts of the country although the study was conducted in an accredited teaching institution. As the study relied upon self-reported data, some subjects could have given socially acceptable responses.

CONCLUSION

The present study concludes that the vaccination coverage among healthcare workers was low. There is a significant disparity in vaccination among different occupation groups. Also, significant difference in knowledge about the disease and vaccination was found among different Occupation groups. Suboptimal level of knowledge was noticed among Group D and Housekeeping. Though the other two groups had adequate knowledge still the knowledge practice gap exist. However, with regard to protective titer following complete course of vaccination, majority were not aware of the concept of responders and non-responders which itself is putting them at false protection. All these issues mandate the need for awareness generation among all

cadres of healthcare workers through regular training sessions and immunization programs.

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