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HEPATITIS B VACCINATION STATUS AMONG HEALTH CARE WORKERS AT CIVIL HOSPITAL KARACHI

1. **ANEEL SHAM VASWANI**
MBBS, MCPS.
2. **NIAZ AHMED SHAIKH**
MRCP (UK), FRCP (Edin), FRCP (London)
3. **SHAHEEN. A.BHATTY**
FCPS.
4. **FAIZA GHUMAN**
MBBS.
5. **MUHAMMAD IRFAN**
MBBS, MCPS.

1. ***Resident Medical Officer***
Medical Unit Five
DOW UNIVERSITY OF HEALTH SCIENCES/ CIVIL HOSPITAL KARACHI
2. ***Associate Professor***
Medicine & Head
Medical Unit Five
Dow University of Health Sciences/ Civil Hospital Karachi
3. ***Assistant Professor of Medicine***
Medical Unit Five
DOW UNIVERSITY OF HEALTH SCIENCES/ CIVIL HOSPITAL KARACHI
4. ***Post Graduate***
Trainee of Medicine
Medical Unit Five
DOW UNIVERSITY OF HEALTH SCIENCES CIVIL HOSPITAL KARACHI.
5. ***Resident Medical Officer***
Medical Unit Five
DOW UNIVERSITY OF HEALTH SCIENCES/ CIVIL HOSPITAL KARACHI

Correspondence to:
DR. ANEEL SHAM VASWANI
esident Medical Officer
Medical Unit Five
DOW UNIVERSITY OF HEALTH SCIENCES/ CIVIL HOSPITAL KARACHI

ABSTRACT

OBJECTIVE: *To assess the vaccination and the post vaccination status of health care workers against hepatitis B virus infection at civil hospital Karachi.*
STUDY DESIGN: *Cross sectional study*
PLACE & DURATION: *Civil Hospital Karachi, March - April 2009.*
MATERIALS & METHODS: *Three hundred thirty six health workers were included in this study. After verbal consent a self administered pre coded and pre tested questionnaire in English and in Urdu language, was filled by the respondent or by investigator.*
RESULTS: *A total of 336 health workers were interviewed. Out of them 177(52.7%) were female & 159 (47.3%) were male.. There were 153 (45.5%) doctors, 95 (28.3%) nursing staff, 54(16.1%) technicians and 34 (10.1%) house keeping staff. Out of 336 health workers two seventy five (81.8%) were vaccinated for HBV infection. Out of them 211(76.72% of vaccinated group and 62.8% of total population of study) were completely vaccinated ,Sixty four (23.27% of vaccinated group and 19% of total population of study) were partially vaccinated. Remaining sixty one (18.2%) were not vaccinated at all. Highest frequency of vaccination was seen in doctors (96.8%) and least in house keeping staff (32.35%). (P=0.0001). A significant difference between vaccinated & non vaccinated groups (P=0.0001) was noted in the knowledge about hepatitis infection, vaccination, hazards of not getting vaccination, practice of checking pre vaccination HBSAg status.*
CONCLUSION: *Vaccination status for hepatitis B infection among the health care workers still is far behind because, 100% status is not yet achieved despite the availability of vaccination for last 20 years.*

KEY WORDS: Health worker, Vaccination, Hepatitis B, Immunity

INTRODUCTION

Hepatitis B is the major health problem globally resulting in enormous burden on healthcare system and is a major source of patient's misery. It is also an important cause of heptocellular carcinoma and is likely to remain a serious health problem resulting in substantial morbidity and mortality for several decades to come.[1]

The prevalence of Hepatitis B virus (HBV) varies greatly in different parts of the world. HBV is endemic worldwide with the area of highest endemicity being China, Southeast Asia, Sub Sahara Africa, most of Pacific island and the Amazon basin.[2] Approximately 30% of the world population has serological evidence of hepatitis B virus infection and among them 350 million have chronic HBV infection. About 75% of the entire chronically infected carriers worldwide are found in Asia and at least one million die from liver cirrhosis and liver cancer each year.[3-4]

In Pakistan the prevalence and incidence of hepatitis B is significantly high. A community based study in Hafizabad, showed a 4.3% prevalence of HBV infection.[5] About 31% cases of acute hepatitis, 60% cases of chronic liver disease and 59 % of heptocellular carcinoma are due to HBV infection.[6] Health care workers (HCWs) are four times more at risk of acquiring the HBV infection than general population.[7] Sharp injuries while handling the infected blood of patients with HBV infection is the most likely risk factor of getting infection in this group. Overall, the estimated risk of hepatitis B infection after an occupational exposure ranges from 20-30%. [8,9] The prevalence of HBV infection in HCWs is from 1.4-14.5% (In Pakistan 5 to 9%) and 20.9% in non professional staff. [10]

Pakistan is a developing country and has poor health indicators. It ranks 134th of the 174 countries on the human development index of the United nation. In Pakistan over

one –third of the people are living in poverty and have a fragile health structure; many patients cannot afford the costly treatment of this disease. [1]

Looking at the alarming figures related to this disease, health structure and living style of our country people; prevention is the only option to get rid from this endemic infection. The safe and effective method of prevention is vaccine against HBV infection that is available for last 20 years. This is a highly effective vaccine, with 95% seroconversion rate .[9] Risk of acquiring HBV infection and status of Hepatitis B vaccine in developing countries have been poorly quantified, particularly the data regarding the risk to different categories of HCWs like nurses and supporting non professional staffs who clean the wards and instrument, is scarce.[10] The present study was undertaken to assess the vaccination and the post vaccination status of health care workers against hepatitis B virus infection at Civil Hospital Karachi and also to compare the status with the previous conducted study at the same and other centers.

Study Design:

Cross sectional study

Place & Duration:

This study was conducted at Civil Hospital Karachi, March - April 2009.

MATERIALS & METHODS:

Three hundred thirty six health workers were included in this study. This sample size of 336 was calculated, using 5% level of significance, margin of error as 5% and an expected prevalence of 72%. All health workers were explained about the purpose of study and verbal consent was taken. The participants were doctors, staff nurses, nursing students, nursing assistants, operation theater technicians, laboratory technicians, blood bank technicians, house keeping staff and sweeper, of all the departments of hospital. A self administered pre coded and pre tested questionnaire in English and in Urdu language, inquiring about the age, sex , occupation, designation , duration of work, department of respondents and questions regarding knowledge about hepatitis B, checking of pre vaccination serology of hepatitis B, status of vaccination and post vaccination of hepatitis B was filled by the respondent or by investigator and monitored by one co- investigator who was responsible for the quality and completion of the questions.

STATISTICAL ANALYSIS:

Data was entered by two people to control the bias and was analyzed with the help of SPSS program version 15.0. Mean and standard deviations of continuous variables like age & duration of work was calculated. Frequency and percentage was computed for categorized variable. Chi-square and correlation coefficient were used for observing the significance of difference in vaccinated group and non vaccinated group. P- Value <0.05 was taken as level of significance.

TABLE NO.1

DESIGNATION AND DEPARTMENTS OF RESPONDENTS

	Medicine & allied	Surgical & allied	Gynae	Laboratory/ pathology	Total
Consultants	13 (38.2%)	12 (35. 3%)	9 (26.5%)	0 (0%)	34 (100%)
Medical officer/PG	38 (64. 4%)	15 (25. 45%)	6 (10.2%)	0 (0%)	59 (100%)
Interns	30 (50%)	22 (36. 7%)	8 (13.3%)	0 (0%)	60 (100%)
Staff nurse	22 (40.7%)	22 (40. 7%)	10 (18.5%)	0 (0%)	54 (100%)
Nursing assistant	2 (66. 7%)	1 (33. 3%)	0 (0%)	0 (0%)	3 (100%)
Nursing student	20 (52.7%)	15 (39. 4%)	3 (7.9%)	0 (0%)	38 (100%)
OT technicians	1 (12.5%)	5 (62. 5%)	2 (25%)	0 (0%)	8 (100%)
Lab technicians	0 (0%)	0 (0%)	0 (0%)	21 (100%)	21 (100%)
Icu technicians	5 (62. 5%)	2 (25%)	1 (12.5%)	0 (0%)	8 (100%)
Technical student	4 (23.5%)	6 (35. 3%)	0 (0%)	7 (41. 2%)	17 (100%)
Ward boy/ massi/ia	9 (52.9%)	6 (35. 3%)	2 (11.8%)	0 (0%)	17 (100%)
Sweeper	6 (35. 3%)	5 (29. 4%)	2 (11.8%)	4 (23.5%)	17 (100%)

RESULTS:

A total of 336 health workers were interviewed. Out of them 177(52.7%) were female & 159 (47.3%) were male. The mean age of study population was 29.67± 9.32 (18-56) years and mean duration of working as health worker was 7.54 (0.25-40) years. There were 153 (45.5%) doctors, 95 (28.3%) nursing staff, 54(16.1%) technicians and 34 (10.1%) house keeping staff. Designation and departments of respondents is shown in the table no 1.

Out of 336 health workers two seventy five (81.8%) were vaccinated for HBV infection. Out of them 211(76.72% of vaccinated group and 62.8% of total population of study) were completely vaccinated (Three or more than 3 dose), Sixty four (23.27% of vaccinated group and 19% of total population of study) were partially vaccinated ,Thirty five (54.7%) health workers received one dose and twenty nine (45.3%) received two dose of vaccination) and remaining sixty one (18.2%) were not vaccinated at all. The questions asked and their responses are given in table 2.

Highest frequency of vaccination was seen in doctors (96.8%) and least in house keeping staff (32.35%). (P=0.0001). Those HCWs who were more experienced had a better vaccination status. A significant difference between vaccinated & non vaccinated groups (P=0.0001) was noted in knowledge about hepatitis infection, vaccination, hazard of not getting vaccination, practice of checking pre vaccination HBSAg status. Details are given in table no.3. The responses were also analyzed according to the working groups that showed a significant difference

was noted between various working groups in knowledge about hepatitis infection, vaccination, hazard of not getting vaccination, practice of checking pre vaccination HBSAg status. Details are given in table no.4.

DISCUSSION:

Health care workers have a greater probability of acquiring Hepatitis B infection, because they are occupationally exposed. The need for vaccination against this disease should be considered as a priority. HBV vaccine is highly effective with 95% seroconversion rates.[11] Our study revealed that 81.8% (n=275) of the HCWs were vaccinated against HBV infection. Out of them 211(76.72% of vaccinated group and 62.8% of total population of study) were completely vaccinated, sixty four (23.27% of vaccinated group and 19% of total population of study) were partially vaccinated and remaining 61(18.2%) were not vaccinated, while Abdul Rauf et al [12] from same institute reported that 52% of the HCWs completed their vaccine against HBV infection, while14.4% of the HCWs had incomplete vaccination and 33.6% of the HCWs were not at all vaccinated , Surestha et al [10] & Nasir et al [13] have reported vaccination rate of 48%(all are received complete dose of HBV vaccine) & 49%(details regarding vaccination dose were not mentioned) respectively among the HCWs. . Muhammad S Memon et al[14] study revealed that 64% (n=589) of the HCWs were vaccinated against HBV infection. Out of them 392(66.5% of vaccinated group and 42.47% of total population of study) were completely vaccinated, 197 (33.5% of vaccinated group and 21.34% of total population of study) were partially vaccinated and remaining 334(36%) were not vaccinated. Compared to above studies, the state of complete vaccination status has improved. The vaccination status of our study is quite comparable to Mehrdad A et al[15] they have reported 62% complete vaccination rate. Data from Agha Khan University [9] showed 86% of HCWs received complete dose of HBV vaccine only 2% did not get single dose of vaccine, which is very much better vaccination rate from our study but still less than ideal coverage, reason for better vaccination rate was that this study is from private and largest hospital of the country where vaccine is provided by hospital free of cost and the hospital follows standard rules and regulation,.

The most frequent reason amongst the non vaccinated health care workers for not receiving or discontinuing vaccination in this study was unavailability of the vaccination

TABLE NO .2

QUESTIONS & RESPONSES GIVEN BY HEALTH CARE WORKERS.

Q.1 Have You Heard About Hepatitis B?	YES NO	324 12	96.4% 3.6%
Q.2 Did You Get (check) Serology of Hepatitis B (Hepatitis B .S.Antigen) In Your Life or Just before Hepatitis B Vaccination?	YES NO	161 175	47.9% 52.1%
Q.3 By whom were you Advised to Get (check) Serology of Hepatitis B (Hepatitis B .S.Antigen)?	By Doctor By self made compulsory by Govt by friend/ family member By some authority	39 77 5 8 32	24. 22% 47. 8% 3. 1% 4. 9% 19. 8%
Q.4 Do You Have Knowledge about Hepatitis B Vaccination?	YES NO	309 27	92% 8%
Q.5 Did You Get Vaccination against Hepatitis B?	YES NO	275 61	81. 8% 18. 2%
Q.6 who had Advised You to Get Vaccination against Hepatitis B?	By Doctor By self made compulsory by govt by friend/ family member By some authority	37 120 18 33 67	13. 5% 43. 6% 6. 5% 12% 24. 3%
Q.7 Have You Completed the Vaccination course (Doses) against Hepatitis B?	YES NO	211 64	76.72% 23.27%
Q.8 If You Got complete course (Doses) of the Vaccination then Which Regimes Did You follow?	0,1&6 month 0,1&3 month Not remember	127 81 3	60.1% 38.3% 1.6%
Q.9 If Answer of Question .7 Is No then How Many Doses of Vaccination You Received?	One Two	35 29	54.7% 45.3%
Q.10 If Answer of Question .7 Is No then Reason for Incomplete Vaccination?	Not Provided by Govt Just Ignorance Waiting for Next Dose High Cost No any Particular reasons Any Reactions other reason	26 13 10 1 8 1 5	40.6% 20.3% 15.63% 1.56 12.5% 1.56 7.8%
Q.11 If Answer of Question .7 Is Yes then did You Receive Booster Dose of Vaccination?	YES NO Not applicable Not remember	68 97 45 1	32.2% 46% 21.4% 0.44%
Q.12 When Did You Get Vaccination against Hepatitis B?	Less than 1 year 1-5 years 6-10 years More than 10 years	 54 82 89 50	 19.6% 29.82% 32.2% 18.4%

Continuance ...

(non provision by government) followed by ignorance (lack of interests/unawareness). Whereas the studies done at Agha Khan University and two Hyderabad medical universities [9, 14] reason amongst the non vaccinated health care workers for not receiving or discontinuing vaccination was ignorance. Where as studies done at Fatima Jinnah Medical College and Allama Iqbal Medical College Lahore, [13, 17] the main reasons cited for not receiving vaccination was high cost followed by the non availability of the vaccine.

There was significant difference in rate of vaccination in various working groups. The highest vaccination rate was seen in doctors (96.8%) followed nursing staff **(**86. 3%), technicians (63%) and least in house keeping staff (32.35%).Similar results of vaccination rates were reported in different studies.[10,16,13] But Muhammad S Memon et al [14] & Nilofer et al [9]reported better vaccination rate of house keeping staff i-e 63.1% & 90 % respectively. Low coverage of HBV vaccination among HCWs, particularly among house keeping staff and technicians in this central hospital of the major city, indicates that the situation would be worse in the peripheral parts of the country.

In our study we also found that increased working experience (10.16 years) was significant factor in higher rate vaccination that suggest that more experience in working as a hospital staff reflects more awareness regarding various communicable diseases. Similar results were reported by Muhammad S Memon et al [14]

Health care workers working in surgery & allied (88.2%), gynecological wards (87.5%) and in medicine & allied (82.6%) are very much better vaccinated than laboratory HCWs (51.4%). A report from the University of California at los Angles[17] also showed that only 40% of Pathologist and 51.9% Gynecologists were vaccinated. Data from Fatima Jinnah Medical College Lahore[18] also shows that 3.75% laboratory HCWs were vaccinated While Nasir et al study reported, that HCWs working in medicine & allied (58.4%) & laboratory HCWs (45%) were better vaccinated than surgery & allied HCWs (42%).

It was observed that medical officers/post graduate residents (100%) and interns (96.6%) had better vaccination coverage than consultants (91.17%). On the contrary other studies have reported that consultants had better vaccination coverage than junior doctors [13, 18] This may be due to the fact that for last three to five years, the vaccination status is being assessed on entry into medical universities and those who are not vaccinated, are advised to be vaccinated.

Q.13 If Answer of Question .5 Is No Reason for Not Receiving the Vaccination against Hepatitis B?	Not awareness Not Provided by Govt Just Ignorance High Cost Not Recommended No any Particular reasons other reason	24 9 8 4 1 11 4	40% 15% 12.5% 6.5% 1.5% 18% 6.5%
Q.14 Have You Checked Post Vaccination Antibodies Titer?	YES NO	50 225	18.2% 81.8%
Q.15If Answer of 14 Question Is yes then what is the level of Antibodies Titers	More than 100iu/dl 10-100iu/dl Less than10iu/dl Not remember	18 8 4 20	36% 16% 8% 40%
Q.16If Answer of 14 Question Is no then Reason for not Checking the Post Vaccination Antibodies Titers?	Un- awareness Non availability of checking facilities at our hospital Just Ignorance High Cost Not Recommended No any Particular reasons other reason Incomplete Vaccination	69 12 62 6 19 22 2 33	30.6% 5.3% 27.5% 2.6% 8.4% 9.7% 1% 14.6%
Q.17 Are your family members vaccinated?	YES NO	201 135	59.8 % 40.2%
Q.18 Are you aware about hazards of not getting vaccination?	YES NO	288 48	85.7% 14.3%

Table.3

CHARACTERISTICS OF THE HEALTH WORKER STRATIFIED BY HBV VACCINATION STATUS.

Characteristics		**Vaccinated (n=275)**	**No vaccinated (n=61)**	**P-value**	**Spearman's rho**
Age		29.16 ± 8.4 (18-55)	31.98 ± 12.42 (18-56)	0. 992	0. 001
Duration of work(years)		10.16 ± 10.14 (0. 5-40)	6.9 ± 7.73 (0. 25-35)	0. 115	0. 086
Sex	Male	127(79. 8%)	32(20. 2%)	0. 376	- 0. 048
	Female	148(83.6%)	29(16. 4%)		
	Doctors	148 (96. 8%)	5 (3. 2%)		
Working groups	Nursing staff	82 (86. 3%)	13 (13. 7%)	0. 0001	0. 474**
	Technicians	34 (63%)	20 (37%)		
	House keeping staff	11 (32. 35%)	23 (67. 65%)		

Continuance ...

Consultants, medical officers/post graduate residents and interns of surgery & allied & gynecological wards are all vaccinated while in medicine & allied wards, medical officers/ post graduate residents (100%) and interns (93.3%) have better vaccination coverage than consultants (84.6%).

The centers for disease control and prevention (CDC) and American Association for the study of liver diseases (AASLD) guidelines recommends post vaccination antibody test, 1-2 months after completing three dose regimen of hepatitis B vaccination in the HCWs .[19] If test proves negative (<10 iu/ml), the three dose series has to be repeated and then antibodies should be tested again there after. If there is no antibody response, no further vaccination is recommended and they are considered as non responders to hepatitis B vaccination.

In our study, Post vaccination hepatitis B antibodies status was checked only in 18% HCWs, out of them 80% were doctors and most of them were medical officer/ post graduate trainee(32%) followed by consultants (28%).14% HCWs had negative immunity(<10 iu/dl), 40% were not able to recall their immune status. The most frequently quoted reason amongst the health care workers for not checking the post vaccination hepatitis B antibodies status was ignorance (lack of interests/unawareness) followed by incomplete vaccination. A study from same institution[2] showed that only 2% of the vaccinated HCWs had checked their antibodies after vaccination ,detail were not mentioned regarding non responders, reason for not checking titer. A study from FJMC Lahore showed that 11.5% doctors checked their antibodies most of them 87.5% were consultants [18]. In the study conducted at the Armed Forces Hospital, Sharourah, Kingdom of Saudi Arabia, only 10% of the health workers had checked their antibodies after vaccination. [20] A study from Agha Khan University [9] showed that 19% of the vaccinated HCWs had checked their antibodies after vaccination,detail were not mentioned regarding non responders & reasons for not checking titer. A study from Nepal showed that seroconversion, rate was 85.9% that is quite comparable to our study 86%. But lower than Barone P & et al study that showed 97% seroconversion rate.[21]

Eighty six percent HCWs were aware about hazards of not getting vaccination. Still 3.6% & 8% HCWs had not heard about hepatitis B or had any knowledge about hepatitis B vaccination respectively. Most of them were house keeping staff (83.4% & 88.9% respectively). Study from same institute [2]

Departments	Medicine & Allied	124 (82. 6%)	26 (17. 4%)		
	Surgery & Allied	98 (88. 2%)	13 (11. 8%)	0. 048	0.108**
	Gynecological	35 (87. 5%)	5 (12. 5%)		
	Pathology	18 (51. 4%)	17 (48. 6%)		
Knowledge about Hepatitis B infection	Yes	273 (84. 2%)	51 (15. 8%)	0. 0001	0. 325**
	No	2 (16. 67%)	10 (83. 33%)		
Pre Vaccine HBSAg Checked	Yes	145 (90%)	16 (10%)	0. 0001	0.204**
	No	130 (74. 2%)	45 (25. 8%)		
Knowledge about Hepatitis B vaccine	Yes	270 (87. 37%)	39 (12. 63%)	0. 0001	0. 486**
	No	5 (18. 6%)	22 (81. 4%)		
Awareness about hazards of not getting vaccination	Yes	261 (90. 7%)	27 (9. 3%)	0. 0001	0. 558**
	No	14 (29. 1%)	34 (70. 9%)		
History about family member vaccination	Yes	194 (96. 5%)	7 (3. 5%)	0. 0001	0. 464**
	No	81 (60%)	54 (40%)		

TABLE. 4.
THE RESPONSES OF HEALTH WORKERS ACCORDING TO THE WORKING GROUPS

		Doctors	Nursing Staff	Technicians Staff	House Keeping
Knowledge about Hepatitis B infection	Yes No	153(100%) 0(0%)	94(98.9%) 1(1.1%)	53(98.1%) 1(1.9%)	24(70.6%) 10(29.4%)
Awareness about hazards of not getting vaccination	Yes No	153(100%) 0(0%)	89(93.7%) 6(6.3%)	40(74.1%) 14(25.9%)	6(17.6%) 28(82.4%)
Pre Vaccine HBSAg Checked	Yes No	79(51.6%) 74(48.4%)	52(54.7%) 43(45.3%)	23(42.6%) 31(57.4%)	7(20.6%) 27(79.4%)
Knowledge about Hepatitis B vaccine	Yes No	153(100%) 0(0%)	94(98.9%) 1(1.1%)	52(96.3%) 2(3.7%)	10 (29.4%) 24(70.6%)
History of complete vaccination	Yes No	133(89.9%) 15(10.1%)	49(59.8%) 33(40.2%)	26(76.5%) 8(23.5%)	3 (27.4%) 8(72.6%)

Continuance ...

showed that 78% HCWs knew that hepatitis B can be prevented with vaccination. Though, pre vaccination checking of HBSAg status is not mandatory for mass vaccination, but those who checked it prior to vaccination had better compliance with it compared to those who did not check it. HBSAg was checked prior to vaccination in 47.9%of the HCWs. while Abdul Rauf et al [12] from same institute have reported that 36% of the HCWs had checked HBSAg prior to vaccination. Muhammad S Memon et al[14] study revealed that 41.2% (n=381) of the HCWs checked HBSAg prior to vaccination. Our study revealed that 59.8% of the HCWs families were vaccinated that is higher than in the previously conducted study in the same institute.

CONCLUSION AND RECOMMENDATIONS

Vaccination status for hepatitis B infection among the health care workers still is far behind because, 100% status is not yet achieved despite the availability of vaccination for last 20 years. This status for HCWs is not desirable as they are the most exposed to this deadly virus. To overcome this gap, vaccination to hepatitis B infection must be made mandatory before admission in medical universities, which has already been started. Also before employing any staff in hospital of any cadre, vaccination should be made compulsory. Availability of vaccination should be made by the Government through out the year for all the HCWs including the doctors and house keeping staff. Still there is a need for education of the house keeping staff about hepatitis B and its vaccination.

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who has Advised to Get Vaccination against Hepatitis B?	By Doctor	17(11.5%)	12(14.6%)	7(20.6%)	1(9.1%)
	By self	103(69.6%)	10(12.2%)	7(20.6%)	0(0%)
	made compulsory by Govt	5(3.4%)	13(15.9%)	0(0%)	0(0%)
	by friend/ family member	20(13.5%)	5(6.1%)	8(23.5%)	0(0%)
	By some authority	3(2%)	42(51.2%)	12(35.3%)	10(90.9%)
Reason for in complete vaccination	Not Provided by Govt	0(0%)	18(54.5%)	1(12.5%)	7(87.5%)
	Just Ignorance	7(46.7%)	5(15.2%)	1(12.5%)	0(0%)
	Waiting for Next Dose	2(13.3%)	5(15.2%)	3(37.5%)	0(0%)
	High Cost	0(0%)	1(3%)	0(0%)	0(0%)
	No any Particular reasons	4(26.7%)	3(9.1%)	1(12.5%)	0(0%)
	Any Reactions	1(6.7%)	0(0%)	0(0%)	0(0%)
	other reason	1(6.7%)	1(3%)	2(25%)	1(12.5%)
Reason for not getting vaccination	Not awareness	0(0%)	2(15.4%)	6(27.3%)	16(76.2%)
	Not Provided by Govt	0(0%)	4(30.8%)	1(4.5%)	4(19%)
	Just Ignorance	2(40%)	1(7.7%)	4(18.2%)	1(4.8%)
	High Cost	1(20%)	0(0%)	3(13.6%)	0(0%)
	Not Recommended	0(0%)	1(7.7%)	0(0%)	0(0%)
	No any Particular reasons	1(20%)	3(23.1%)	7(31.8%)	0(0%)
	other reason	1(20%)	2(15.4%)	1(4.5%)	0(0%)
History of booster Dose	Yes	50(37.6%)	9(18.4%)	9(34.6%)	0(0%)
	No	71(53.4%)	14(28.6%)	11(42.3%)	1(33.3%)
	Not applicable	11(8.3%)	26(53%)	6(23.1%)	2(66.7%)
	Not remember	1(0.8%)	0(0%)	0(0%)	0(0%)
Checking of post vaccine antibodies titers	Yes	40(27%)	8(8.5%)	3(8.8%)	0(0%)
	No	108(73%)	75(91.5%)	31(91.2%)	11(100%)
Reason for not Checking of post vaccine antibodies titers	Un- awareness	8(7.4%)	43(57.3%)	11(35.5%)	7(63.6%)
	Non availability of checking facilities at our hospital	11(10.2%)	0(0%)	1(3.2%)	0(0%)
	Just Ignorance	50(46.3%)	9(12%)	3(9.7%)	0(0%)
	High Cost	2(1.9%)	0(0%)	4(12.9%)	0(0%)
	Not Recommended	11(10.2%)	3(4%)	5(16.1%)	0(0%)
	No any Particular reasons	17(15.7%)	3(4%)	2(6.5%)	0(0%)
	other reason	2(1.9%)	0(0%)	0(0%)	0(0%)
	Incomplete Vaccination	7(6.5%)	17(22.7%)	5(16.1%)	4(36.4%)
History of family members vaccination	Yes	135(88.2%)	39(41.1%)	25(46.3%)	2(5.9%)
	No	18(11.8%)	56(58.9%)	29(53.7%)	32(94.1%)

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