

Screening of Healthcare personnel for Human Immuno Deficiency Virus (HIV), Hepatitis B (HBV) and Hepatitis C(HCV) Infections in Mahathma Gandhi Memorial Hospital, Warangal, Telangana

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ABSTRACT

Aim and Objectives:

1. To screen health care personnel for HIV, Hepatitis B and Hepatitis C infections at Mahathma Gandhi Memorial Hospital, Warangal.
2. To alert health care personnel regarding modes of transmission of these infections and prevention by proper vaccination.
3. To know their knowledge about biomedical waste guidelines and management of biomedical wastes.
4. To know the seroprevalence of HIV, HBV, HCV in Health care personnel.

Materials and Methods: A prospective study was done by filling a proforma consisting of questions regarding modes of transmission of these infections, history of vaccination, blood transfusion, needle stick injuries and disease prevention practices followed by the health care personnel working at Mahathma Gandhi Memorial Hospital, Warangal, Telangana. After taking an informed consent 498 blood samples were collected, which include 298 blood samples from study group i.e, health care personnel and 200 blood samples from general healthy population (control group). Blood samples were screened for HIV antibodies by HIV Tridot test, for Hepatitis B surface antigen by ELISA (HepaLISA) and for HCV antibodies by ELISA (erbaLISA HCV Gen3 [V2]).

Results: Seroprevalence of Hepatitis B surface antigen in health care personnel was 0.67%, HIV antibodies was 0.34%, and no antibodies were detected for HCV in health care personnel.

Conclusion: Our results show prevalence of Hepatitis B antigen and HIV antibodies in health care personnel at Mahathma Gandhi Memorial Hospital, Warangal is slightly higher to that of general healthy population and no prevalence HCV in the health personnel was detected on screening. This indicates proper practice, training, knowledge about handling biomedical waste which prevent transmission of HIV, HBV, HCV infections from patients to health care personnel.

Keywords: Healthcare personnel, seroprevalence, HIV, HBV, HCV

INTRODUCTION

Healthcare worker (HCW) is defined as a person whose activities involve contact with patients or patient bodily fluids.^[1] This includes nurses, physicians, pharmacists, technicians, dentists, students, attending clinicians, public safety workers, emergency response personnel, health care waste workers, first aid providers,

and volunteers. An occupational blood exposure (OBE) is a percutaneous injury (e.g. a needle stick or cut with a previously used sharp medical device) or contact between a mucous membrane or non-intact skin (e.g. exposed skin that is chapped, abraded or afflicted with dermatitis) and blood, tissue, or other body fluids that may place a HCW at risk of blood borne infections.^[1]

The risk of occupational infection is highest for HBV (6 to 30%) followed by HCV (1 to 2%) and HIV (0.3%). It has been estimated that globally, the annual proportions of health care workers exposed to blood borne pathogens was 2.6 % (16,000) for HCV, 5.9 % (66,000) for HBV and 0.5 % (1000) for HIV.^[2,3] Of these Hepatitis B is not only the most transmissible infection, but also the only one that is preventable by vaccination. In developing countries, Hepatitis B vaccination coverage among health care workers is very low for various reasons, including awareness, risk assessment and low priority given by the health managements of both government and private Hospitals. Most of the Hospitals lack post-exposure management strategies including coordination among various departments for testing and vaccination.^[4]

The study main objective was to focus on the screening of health care personnel for HIV, Hepatitis B and Hepatitis C infections at Mahathma Gandhi Memorial Hospital, Warangal and to know their knowledge regarding modes of transmission of these infections and practices about biomedical waste guidelines.

MATERIALS AND METHODS

A prospective study was done during a period of 6 months from January 2018 to June 2018 at Mahathma Gandhi Memorial Hospital, Warangal by filling a proforma consisting of age, gender, marital status, duration and department of Hospital employment, history of blood transfusion/blood donation, chronic illness for which hospitalization was required, any surgeries, open wound contamination, mucous membrane exposure, spillage of fluids, multiple sexual partners.

History of needle stick injuries and whether tested after needle stick injury and if yes duration after which they were tested. History of Hepatitis B vaccination, number of doses of vaccine taken and whether antibody titre levels measured after vaccination. Regarding knowledge about modes of transmission (Needle stick injury/sexual/vertical transmission) of these viruses, risk of exposure in the hospital job and attitude of disease prevention like Hand washing, precautions to avoid needle stick injury and wearing gloves during procedures.

Health care personnel with employment > 1 year were included in the study. Blood samples were collected, after taking written consent. 298 blood samples were from study group i.e, health care personnel and 200 blood samples were from general healthy population (control group).

Blood samples were centrifuged to separate the serum and serum was stored at -20°C, if there is any delay in analysis. All serum samples were brought to room

temperature before testing. Screening for HIV antibodies 1 & 2 was done by HIV Tridot test according to WHO testing criteria, for Hepatitis B surface antigen detection, ELISA using HepaLISA kits and for HCV antibody tests were performed by ELISA (erbaLISA HCV Gen3 [V2]) according to manufacturer's instructions.

Ethical Approval

This was taken from institutional ethics committee of Kakatiya Medical College and Mahathma Gandhi Memorial Hospital, Warangal. Also a written consent was taken from Health care personnel before taking a blood sample. All the information obtained from health care personnel in the proforma, investigations done and reports of the tests were kept strictly confidential.

RESULTS

Out of the total study population (498), n=298 blood samples were from study group i.e, health care personnel, n=164 were female and n=134 were male. Majority of them belonged to age group 20-40 years (n=226) and married (n=240), with hospital employment duration 1-10 years (n=171) [Table 1,2,3].

Table 1: showing health care personnel department wise

Health Care Personnel	Number	Percentage (%)
Doctors	69	23.15
Head Nurses	23	7.72
Staff Nurses	34	11.40
Lab Technicians	25	8.39
Lab Attendants	07	2.35
Patient Care	37	12.42
Sanitation Workers	97	32.55
Sweepers	06	2.02
Total	298	

Table 2: Age, gender, marital status of health care personnel

Health Care Personnel	Number	Percentage (%)
Age		
20-30 Years	108	36.24
31-40 Years	118	39.60
41-50 Years	51	17.12
51-60 Years	21	7.04
Gender		
Male	134	44.97
Female	164	55.03
Marital Status		
Married	240	80.54
Unmarried	58	19.46

Table 3: Hospital employment of health care personnel in years

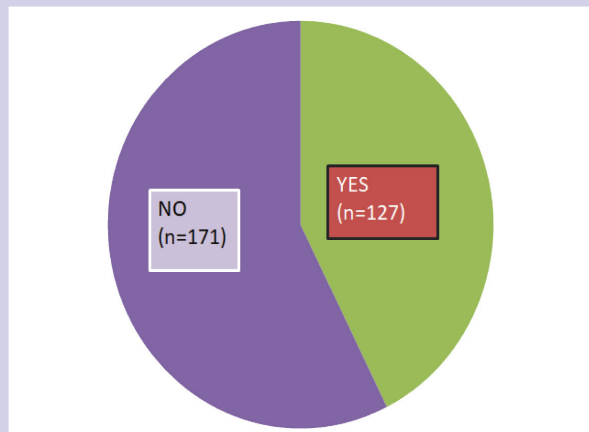
Hospital Employment Duration	Number	Percentage (%)
1-10 Years	171	57.38
11-20 Years	80	26.85
21-30 Years	34	11.41
31-40 Years	13	4.36

Table 4: Knowledge of HIV, HBV, HCV among health care personnel

Knowledge about	Yes
Risk of Exposure in Hospital	267
Transmission Modes	267
Handwashing Practices	279
Wearing Gloves	274
Vaccination	132
Regular Screen	149

Regarding knowledge, attitude and practices, most of the health care personnel had enough knowledge about modes of transmission and precautions to be taken for disease prevention. [Table 4]

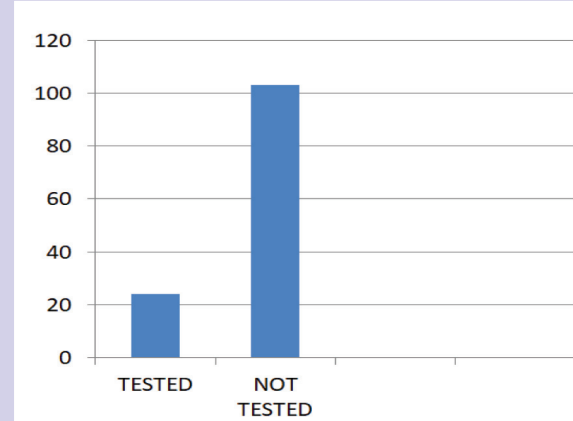
But, 127 health care personnel had needle stick injuries, among them only 24 got tested after injury and none of them were positive to HIV antibodies and Hepatitis B surface antigen. [Graph1,2 & Table 5]



Graph 1: HCP with history of needle stick injuries

Table 5: Duration after which Health care personnel tested after injury

Tested after injury	n = 24	
With in 2 weeks	9	37.50
After 3 months	10	41.66
After 6 months	2	8.34
After 1 year	3	12.50



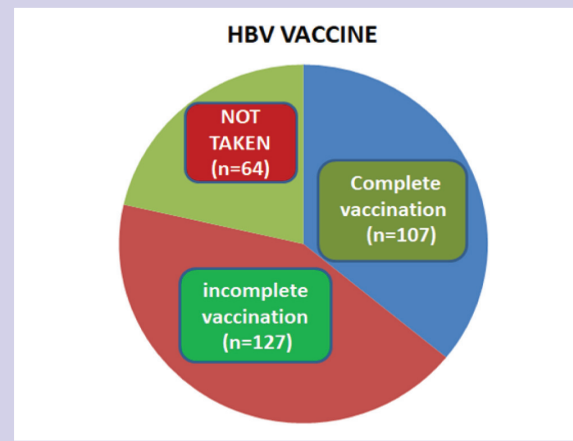
Graph 2: HCP tested after needle stick injury

Table 6: Showing past history in health care personnel

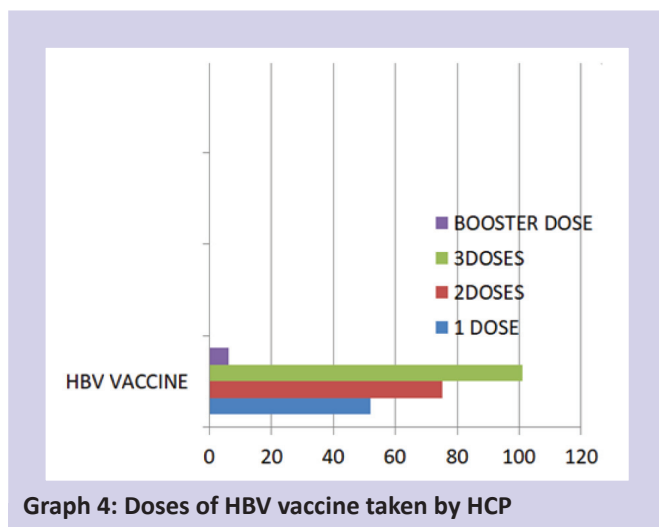
Past History in health care personnel	n
Blood Transfusion	23
Blood Donation	48
Hospitalisation due to illness	78
Surgeries	140
Spillage of fluids	67

67 Health care personnel had history of spillage of fluids but, none had contact with non intact skin or mucous membrane. [Table 6]

HBV vaccine was taken by 234 Health care personnel but, proper vaccination (3doses and booster dose) were taken by only 100 Health care personnel. 64 Health care personnel were not vaccinated. Anti-HBs antibody (a serological marker in those who successfully respond to Hepatitis B immunization) titre levels were measured only in 4 Health care personnel and their Anti-HBs antibody levels were > 10 IU/mL. [Graph 3, 4 & Table 7]



Graph 3: HCP vaccinated



Graph 4: Doses of HBV vaccine taken by HCP

Table 7: Health care personnel Anti-HBs antibody titres measured

Antibody titre levels measured	n
Yes	4
No	294

Seroprevalence of Hepatitis B surface antigen in Health care personnel was 0.67% (2/298), HIV antibodies was 0.34% (1/298) and no antibodies were detected for HCV in health care personnel. HIV and HBV coinfection was 0.34% (1/298).

In Control group (n=200), seroprevalence of Hepatitis B surface antigen was 0.5% (1/200) and HCV antibodies was 0.5% (1/200) and no HIV antibodies were detected. (Table 8)

Table 8: General population age, gender, infections detected

General Population	Number	Percentage (%)
Age	Number	%
10-20 Years	25	12.5
21-30 Years	124	62
31-40 Years	43	21.5
>41 Years	8	4
Gender	Number	%
Male	105	52.5
Female	95	47.5
Infections Detected	Number	%
HCV Infection	1	0.5
HBV Infection	1	0.5

DISCUSSION

Seroprevalence of these 3 blood borne pathogens in Health care personnel in our hospital are less compared

to other studies. There is slight high seroprevalence of HBV in HCP compared to general population.

Seroprevalence of HIV in India in health care workers was 0.1% by Maryam Dafei et al in New Delhi.^[6] No seroprevalence of HIV in health care workers was seen in studies conducted by S. Aziz et al^[8] in Karachi and Sukran Kose et al in Turkey (Table 9, 10).^[11]

Seroprevalence of HBV in India in health care workers was 1.1% by Maryam Dafei et al^[6] in New Delhi and 1.19% by Vijaya Doddaiiah et al^[7] in Karnataka. Seroprevalence of HBV was high in studies conducted in other parts of the world as reported by S. Aziz et al^[8] in Karachi, Javed Sarwar et al^[9] in Abbottabad, Abdelsalam Nail et al^[10] in Sudan as 2.4%.

In Rwanda, Fredrick Kateera et al^[12] reported 2.9%, Jobran M Alqahtani et al^[13] in Saudi Arabia reported 8.7%, Olorun femi Akinbode Ogundele et al^[14] in Nigeria reported 6.7% seroprevalence of HBV (Table 9, 10).

Seroprevalence of HCV in India in health care workers in New Delhi was 4% by Nidhi Jindal et al^[5] and 0.3% was reported by Maryam Dafei et al.^[6]

In World, seroprevalence of HCV was reported by S. Aziz et al^[8] in Karachi as 5.6%, Javedsarwar et al^[9] in Abbottabad as 2.4%, Sukran Kose et al^[11] in Turkey as 1.1%, Fredrick Kateera et al^[12] in Rwanda as 1.3%, Jobran M Alqahtani et al^[13] in Saudi Arabia as 0.3%, Olorunfemi Akinbode Ogundele et al^[14] in Nigeria as 8.1% in health care workers.

No seroprevalence of HCV was reported by Abdelsalam Nail et al^[10] in sudan in health care workers. [Table 9, 10]

One Health care personnel (Sweeper) was found to be co infected with Hepatitis B virus and HIV-1. He absconded from his job even before discussing the results of the tests with him.

Another Health care personnel (Sanitation worker) was found to be seropositive for Hepatitis B virus only. He had a history of vasectomy and needle stick injury 10 years back while handling the biomedical waste.

He was not tested for HIV, HBV, HCV infections after needle stick injury. He had no history of blood transfusion, multiple sex partners.

After counselling, it was found that he was positive for Hepatitis B surface antigen 3 years back.

His spouse found negative for Hepatitis B surface antigen and advised her to take Hepatitis B vaccine 4 doses and to use barrier methods of contraception during sexual contact.

Table 9: Comparison with other studies in India

Studies in India	Place	Year	HIV	HBV	HCV	HIV & HBV coinfection
Nidhi Jindal et al	New Delhi	2006	-	-	4%	-
Maryam Dafei et al	New Delhi	2012	0.1%	1.1%	0.3%	-
Vijaya Doddaiiah et al	Karnataka	2012	-	1.19%	Nil	-
Present study	Telangana Warangal	2018				
Healthcare workers			0.34%	0.67%	Nil	0.34%
Control group			Nil	0.5%	0.5%	Nil

Table 10: Comparison with other studies in world

Studies in World	Place	Year	HIV	HBV	HCV	HBV & HCV coinfection	HIV & HBV coinfection
S.Aziz et al	Karachi	2002	Nil	2.4	5.6		
Javed Sarwar et al	Abbottabad	2007	-	2.4	2.4	3.2%	
Abdelsalam Nail et al	Sudan	2007	-	2.4	Nil		
Sukran Kose et al	Turkey	2012	Nil	Nil	1.1		
Fredrick Kateera et al	Rwanda	2013	-	2.9	1.3		
Jobran M Alqahtani et al	Saudi Arabia	2014	-	8.7	0.3		
Olorunfemi Akinbode Ogundele et al	Nigeria	2015	-	6.7	8.1	1%	
Present study	Telangana Warangal	2018					
Healthcare workers			0.34	0.67	Nil		0.34%
Control group			Nil	0.5	0.5		

CONCLUSION

Health care personnel are at risk of acquiring many blood borne pathogens, hence all should be counselled for dreadful diseases like HIV, HBV, HCV and advised to take universal precautions at work and health record of the health care personnel should be maintained at the time of entry into the hospital services and should be screened at the end of every year. Vaccine should be recommended for all health care personnel for vaccine preventable diseases. Personnel protective equipment, post exposure prophylaxis should be made available in all health care facilities to prevent transmissible diseases.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

FUNDING: None

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