

Occupational Exposure to Blood and Body Fluids amongst Health Care Workers in a Teaching Hospital of the Sukkur, Sindh

1. Javed Ahmed Phulpoto 2. Zulfiqar Ali Bhatti

1. Asstt. Prof. of Medicine 2. Consultant Surgeon, Ghulam Mohd Mahar Medical College / Hospital, Sukkur

ABSTRACT

Background: Health care workers (HCWs) are at risk of infection with blood-borne viruses in the course of their work. Over 90% of these infections are occurring in low-income countries and most are preventable. However, the situation in the teachings hospitals has always been thought to be much better than the public health facilities in other hospitals.

Objective: The focus of the study was on assessing the exposure frequency amongst HCWs in a teaching hospital in the Sukkur.

Study Design: Cross-Sectional Study

Place and Duration of Study: This study was conducted at Ghulam Mohammad Mahar Medical College Hospital, Sukkur, Sindh from November 2011 to December 2011.

Materials and Methods: A cross-sectional survey amongst HCWs involved in collecting blood samples and administering injections in all wards of the hospital was conducted. Selection of study participants was by simple random sampling. A pre-tested questionnaire was administered by unlinked, anonymous method.

Results: Total sample studied was 70. The proportion of HCWs experiencing exposure to blood body fluid splash (BBF) and needle stick injury (NSI) during last one week was 47.1% and 31.43%, respectively. The incidence density of BBF exposure was 537.14 per 100 person years and that of NSI episodes was 228.57 per 100 person years. The reasons for not using personal protective equipment (PPE) ranged from busy schedule (37.14%), non use of PPE by co-workers (67.14%), emergencies (91.43%) risk that patients may get offended by PPE use by HCWs (27.14%) to discomfort while using PPE (24.29%). All components of PPE were available as per only 34.24 percent.

Conclusion: The high level of occupational exposure to blood and body fluids and consequent risk of infection amongst a group of HCWs in the Teaching Hospital highlights the urgent need for interventions to enhance to the occupational safety of workers.

Key Words: Occupational exposure; Blood or body fluids (BBF); Needle stick injuries (NSI); Health care workers.

INTRODUCTION

Health care workers (HCWs) are at risk of infection with blood-borne viruses (BBVs) in the course of their work. This transmission occurs predominantly by percutaneous or mucosal exposure of workers to the blood or body fluids of infected patients by splashes (BBF) or needle stick injuries (NSI). Prospective studies of HCWs have estimated that the average risk for transmission after a per-cutaneous exposure is approximately 0.3%, 6 to 30% and 1.8% for HIV, hepatitis B and hepatitis C, respectively. Over 90% of these infections are occurring in low-income countries, and most are preventable¹.

In high-income countries, implementation of standard/universal Precautions (Ups), injury surveillances programmes, provision of personal protective equipment (PPE), routine hepatitis B vaccination, post-exposure prophylaxis (PEP) and engineered safety devices have yielded results. In USA, the proportion of HCWs experiencing one or more NSI in one year preceding survey fell from 24 to 8.6% in a span of eight years^{2,3}.

In the developing countries, the HCWs are at greater risk due to sub-optimal infection control practices like

lack of equipment, training, compliance with Ups⁴. A study amongst HCWs in rural health care facilities showed that proportion exposed of BBF and NSI during last year 37.1% and 63.2% respectively⁵.

However the situation in the teaching hospitals has always been thought to be much better than the public health facilities in Sindh. The availability of PPE, hepatitis B immunization, formalized PEP guidelines, safety devices and availability of drugs is almost universal in the Teaching Hospitals.

This study was conducted to assess the frequency of exposure to BBF amongst HCWs of a tertiary care hospital and to determine the specific jobs leading to increased risk of exposure of BBF amongst them with an aim to provide information for strengthening the present system in the Teaching hospitals.

MATERIALS AND METHODS

A Cross-sectional survey was conducted amongst HCWs involved in collecting blood samples and administering injections. HCWs (nurses and nursing assistants) involved in these activities, from all wards of the hospital were included. The HCWs working in labour room and operation theatre (OT) were not

included in the study as they form a different exposure category and hence need a separate study. The doctors (interns, residents, specialists) were also not included due to same reason.

A total sample of 70 HCWs was studied. Nominal roll of all HCWs of the hospital was obtained and participants were selected by simple random sampling using random number table.

A questionnaire, based on available studies and the WHO and CDC guidelines on Ups, was pilot tested and used for data collection. Institutional ethical clearance was obtained. The questionnaires were handed over after obtaining HCWs consent. A mutually convenient time was fixed for collection of the filled up questionnaire. The filled up questionnaire was checked in the participant's presence to check for any omissions. The omitted questions were then asked and informant's reply noted. A database was created in MS Excel 2007 and appropriate statistical analysis was carried out using SPSS ver 14.0.

RESULTS

Table 1 depicts the study participants' characteristics in relation to the job category. There were 48 (68.57%) males and 22 (31.43%) females (n=70). Though 68 (97.14%) HCWs had been vaccinated against hepatitis B, only 48 (70.59%) had completed the vaccination schedule by taking three doses.

Table No.1: Study participants' characteristics in relation with job category (n= 70)

	Job category		Total
	Nursing assistants	Nurses	
Age in years (Mean $\pm$ SD)	32.58 $\pm$ 7.09	32.45 $\pm$ 8.42	32.54 $\pm$ 7.47
Sex (n)			
Males	48	0	48
Females	0	22	22
Years of experience (median, range)	10.0. 1-25	11.0. 1-23	10.0. 1-25
Hep B doses (n)*			
Less than 3	16	04	20
3 or more	30	18	48

* 02 participants had not been vaccinated against hepatitis B

Table No.3: BBF and NSI Exposure in relation to job category.

Job category	Had an episode of BBF exposure n (%)			Had an episode of NSI exposure n (%)		
	Last week	Last 3 months	Last year	Last week	Last 3 months	Last year
Nur Asst (n=48)	25 (52.08)	41 (85.42)	41 (85.42)	18 (37.5)	27(56.25)	36 (75.0)
Nurses (n=22)	8 (36.36)	15 (68.18)	20 (90.91)	4 (18.18)	12 (54.54)	14 (63.64)
Total (n= 70)	33(47.14)	56(80.0)	61(87.14)	22(31.43)	39(57.1)	50(71.43)

Table No.4: Occupational BBF and NSI exposure incidents during the preceding three months and one year

	BBF exposure		NSI exposure	
	Last three months	Last Year	Last three months	Last Year
Total episodes amongst HCWs	174	376	77	160
Risk of episodes Per HCW	2.5	5.4	1.1	2.3
Incidence density per 100 person years	537.14	228.57		

This was followed by non use of PPE by co-workers (67.14%), busy schedule (37.14%), risk of offending

Table 2 shows details of exposure to BBF and NSI amongst the study participants. The difference between the three months and one year exposure to the BBF was statistically significant ($P=0.000$, Fisher's exact). An appreciable number of HCWs (22, 31.43%) had an episode of NSI during past one week.

The association of exposure to BBF and NSI with job category of HCWs has been depicted in Table 3.

HCWs cited various reasons for not using the PPE and emergencies were the reason cited by most of them (91.43%) for not using the PPE.

Table No.2: Detail of exposure to BBF and NSI among HCWs.

	Exposure to BBFN (%)	Exposure to NSIN (%)
Frequency of exposure (n=70)		
Hardly or never	9 (12.86)	16 (22.86)
Sometimes	37 (52.86)	45 (64.29)
Often	24 (34.28)	9 (12.86)
Exposure during last week		
Yes	33 (47.14)	22 (31.43)
No	37 (52.86)	48 (68.57)
Part of body exposed during last week (BBF, n=33) (NSI, n=22)		
Face	3 (9.09)	-
Face + hand	1 (3.03)	-
Hands	29 (87.88)	1 (4.54)
Index Finger	-	13 (59.10)
Middle Finger	-	4 (18.18)
Thumb	-	4 (18.18)
Exposure during last three months (n=70)		
Never	14 (20.0)	31 (44.28)
Once	22 (31.43)	24 (34.29)
2-5 times	27 (38.57)	15 (21.43)
5-10 times	6 (8.57)	-
>10 times	1 (1.43)	-
Exposure during last year (n=70)		
Never	9 (12.86)	20 (28.57)
Once	9 (12.86)	19 (27.14)
2-5 times	22 (31.43)	23 (32.86)
5-10 times	17 (24.28)	8 (11.43)
>10 times	13 (18.57)	-

the patient (27.14%), discomfort (24.29%) and difficulty in carrying out the job (18.57%). As per

majority, the disposal equipment and sharps containers were always available. However, only 24 (34.29%) said that all components of PPE were available to the HCWs.

Total episodes of BBF and NSI exposures occurring during the preceding three months and one year were calculated using the midpoint of the range for the response options. The total occupational blood exposures and risk to HCWs have been summarized in Table 4. The total risk was 5.4 and 2.3 episodes of BBF and NSIs respectively per HCW during one year.

DISCUSSION

The level of occupational exposure to blood and other body fluids amongst HCWs in the tertiary care medical college hospital of the Sindh is higher than that found by studies from Japan⁶. The very high level of exposure reported in the preceding week (47.14% BBF exposures and 31.43% percutaneous exposure by NSIs) is both an alarming and perplexing finding. This could be due to the phenomenon of forward telescoping, which is the tendency for people to perceive (and therefore report) that an event occurred more recently than it actually did. However, the fact remains that these events occurred and this finding, despite systems in place in the teaching hospitals, warrants further investigation, ideally a study involving prospective injury surveillance.

The proportion of HCWs reporting HSIs in this study is far higher than in the US and Japan. In One Us Study 24% of HCWs (compared to 71.43% in this study) reported a NSI in the preceding year **Error! Bookmark not defined..** In another Us study, 9% nurses reported a NSI in the preceding year as compared to 63.63% in this study **Error! Bookmark not defined..** In Japan 46% nurses suffered NSI during past one year **Error! Bookmark not defined..**

However, the proportion of HCWs reporting NSIs in this study is comparable to that found in India and some other low-income countries. A study in rural health care facilities in India found that during last one year, 37% HCW had episodes of BBF exposure and 63.2% had NSI exposure **Error! Bookmark not defined..** In a medical college hospital in Iran, 71.1% HCWs had an episode of NSI during the past one year⁷. Fifty-five percent of HCWs in Uganda and 57% of injection providers in Mongolia reported a NSI in the last year^{8,9}. More than three-quarters of Chinese nurses (75-82%) experienced a NSI in the preceding year¹⁰.

On comparing the incidence density, our finding of 228.57 per 100 person years. NSI is slightly higher than that found in Taiwan i.e. 196 per 100 person years¹¹ and 194.18 found in Iran **Error! Bookmark not defined..** With the current level of percutaneous blood exposure amongst these HCWs and the population prevalence of BBV diseases in Sindh, the risk of occupational infection with HIV appears to be very

low, but the risks of HCV and HBV seem to be higher, particularly for those HCWs who are inadequately or not vaccinated against hepatitis B.

Perceived barriers to the implementation of UPs clearly influence HCWs ability and willingness to comply with them in practice. Of concern is the fact that 91% said that it is not possible for them to protect themselves from blood exposure in an emergency situation as compared to 75% in rural India¹². The reasons for non-compliance overlap with those reported in studies amongst both developed and developing country HCWs^{13,14,15}.

In our study, only 34% indicated that adequate PPE was always provided at their workplace as compared to 56% in rural India **Error! Bookmark not defined..** It is arguably difficult to establish hospital-wide compliance with UPs without the provision of adequate safety equipment.

Interventions to improve UPs compliance amongst HCWs in the Teaching Hospitals are urgently needed, as these HCWs are experiencing relatively high levels of BBF and NSIs and better compliance is associated with fewer exposures.

The necessity of reinforcing and clarifying the concept of universal precautions and general infection control guidelines, in order to improve knowledge and information and on-going counseling, has been shown by many studies^{16,17,18}.

This study describes a high level of occupational exposure to blood and consequent risk of BBV infection amongst a group of HCWs in the Teaching hospitals and highlights the urgent need for interventions to enhance the occupational safety to workers. A range of responses in addition to the promotion of UPs and the provision of safety equipment are required. A multifaceted approach involving initial and periodic training along with other correlates like provision of PPE is required. Active promotion of UPs and development of injury surveillance systems are also required in Teaching hospitals. Strict implementation of infection control practices as per guidelines is the need of the hour in all Teaching hospitals. The issue of compliance and effective implementation can only be tackled by an active role of the doctors, paramedicals as well as administrators at all levels.

Poorer recall of more distant events as well as the phenomenon of forward telescoping, discussed earlier, may have lead to some under reporting of the incidents. The relationship between recall ability and time follows an exponential functions, so the more distant the reference time period, greater the proportion of under-reported events

CONCLUSION

The high level of occupational exposure to blood and body fluids and consequent risk of infection amongst a

group of HCWs in the Teaching Hospital highlights the urgent need for interventions to enhance to the occupational safety of workers.

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Address for Corresponding Author:

Dr. Javed Ahmed Phulpoto

Assistant Professor of Medicine,
Ghulam Mohd Mahar Medical College (GMC) &
Hospital Sukkur.
Address. H. No 126/A,
Sindhi co-operative housing society,
Airport Road, Sukkur.
Tel. 0333-7123334,
E-mail: jphulpoto@yahoo.com