

Original Article

A descriptive cross-sectional study on the knowledge of occupational exposures and post exposure prophylaxis for HIV and barriers to PEP among health care workers in District General Hospital Kilinochchi, Sri Lanka

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Abstract

Introduction: Bloodborne pathogens acquired through occupational exposure (OE) are a professional hazard for healthcare workers (HCW), and under-utilization PEP services by HCWs places them at a higher risk.

Objective: To assess the knowledge of post-exposure prophylaxis (PEP), determine the underutilization factors, and methods to improve the accessibility of PEP services among different categories of HCWs of DGH Kilinochchi.

Method: A descriptive cross-sectional study was conducted among 181 HCWs using proportionate random sampling. Data were collected through a self-administered questionnaire and analysed in SPSS 21. Using bivariate statistical methods.

Results: Majority of the participants were minor staff (52.5%). Only 56 (39.9%) had exposure to OE and most had needle stick injuries (94.6%). Out of 56 HCWs, 36 (64.3%) had not attended PEP services. Only 29 (16%) had correct knowledge regarding PEP. Nearly half 83 (46%) were vaccinated against Hepatitis B and 19 (10.5%) knew their antibody level. Low awareness (57.5%) and being busy with work (43.6%) were the most common barriers to PEP services. Conducting an annual PEP program in the hospital and during the first appointment of HCW were the preferred methods to increase PEP services. Correct knowledge of PEP was positively associated with medical officers ($P = 0.000$, OR 6.5, 95% CI 2.6-16.6) and participation in the PEP program ($P = 0.001$, OR 5.1, 95% CI 1.9-13.1.) However, knowledge was not associated with the duration of work or prior OE to infectious material.

Conclusion: Knowledge of HCWs on OE and PEP was unsatisfactory, and awareness programs conducted annually and during the first appointment of the HCW can improve their knowledge.

Key words: Health Care workers, Occupational Exposure, Post Exposure Prophylaxis

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Introduction

Bloodborne pathogens acquired through occupational exposure (OE) pose a significant health hazard to healthcare workers (HCW), and blood and body fluids are considered infectious materials. Over 20 pathogens have been identified as via occupational exposure, and HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV) are considered the most crucial infections.

The risk of HIV transmission is 0.3% after percutaneous injury, and the estimated risk of HIV with exposure of infective materials to the mucous membrane (eyes, nose, or mouth) or abraded skin is 0.09% (1) The estimated risk of Hepatitis B following needle stick injury is 6%-30%, and it is 0.5%–10% for hepatitis C. (2,3)

Behavior modification at the workplace, called Universal precautions (UP), is a set of work practice recommendations designed to help reduce occupational exposure to bloodborne pathogens.

However, HIV postexposure prophylaxis (PEP) is vital in an unexpected occupational injury. It includes first aid, counseling, risk assessment, relevant laboratory investigations based on the consent of the exposed person and source, and, depending on the risk assessment, the provision of short-term (28 days) antiretroviral drugs, along with follow-up evaluation. PEP for HIV exposure is best when started as soon as possible; however, after 72 hours, the PEP is not considered effective.(1,4)

In Sri Lanka Ministry of Health had published an updated circular in 2017, outlining a protocol for managing HCWs following OE to infectious materials. (3)

PEP medications for the first 7 days (starter packs) are stored in 24-hour functioning units in hospitals, in case they are needed outside of office hours. The continuation of PEP with assessment is conducted at the STD clinic.

In 2005, estimated that more than 3 million occupation-related percutaneous injuries occur annually worldwide.(5) Moreover, about 40% of HBV and HCV infections and 2.5% of HIV infections in HCW were due to OE.(5–7)

Unfortunately, most cases of OE to HCW are not reported. A study found an annual prevalence of OE in body fluids among HCW of 44.9%, with an average of 1.38 exposures per HCW per year.(8) Globally, up to 75% of OE to infectious material was not reported. (8) In Sri Lanka, 4,125 HCWs attended PEP services following OE during 2019. Of them, 83 HCWs were started on PEP, and only 39 people (47%) have completed PEP for 28 days.(9)

District General Hospital (DGH) Kilinochchi is the leading healthcare institute in Kilinochchi District, which caters to 124,000 population. DGH Kilinochchi employs a large number of HCW, but only a few have reported occupational exposure to infectious materials.

It is vital to assess knowledge of universal precautions and PEP among HCW in DGH Kilinochchi. Further, identifying the possible factors for the non-utilization of PEP services following OE by healthcare workers will help make the services more user-friendly.

Objectives

Objectives of the study were to assess knowledge of OE to infectious materials, UP, PEP, and to determine the factors contributing to the underutilization of PEP services, as well as factors to improve accessibility to PEP services among different categories of healthcare workers at DGH Kilinochchi.

Methods

The study was conducted as a descriptive cross-sectional study among different categories of health care workers in the District General Hospital of Kilinochchi. The study population was all the health care workers attached to the DGH Kilinochchi in 2021. A minimum sample size was calculated with Daniel's (1999) formula for calculating the sample size in prevalence studies. The name registry of all categories of healthcare workers attached to DGH Kilinochchi in the office was used as the sample frame. The sample was selected by a proportionate random sampling method by recruiting a proportional number of subjects from each category of HCWs. Sample size was 181.

Structured self-administrated questionnaire containing close questions was used as the data collection tool. The questionnaire assessed Socio-demographic data, the knowledge and experience of OE, knowledge on UP and PEP, Barriers & mode of Improvement PEP services. Data were analyzed using SPSS 21. All correctly answered four questions UP, OE to infectious materials and PEP for HIV were considered having an adequate knowledge for the OE and PEP.

Ethical approval was obtained from the Ethical Committee of Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka

Results

The majority was Minor staff 95 (52.5%) and mean age of the participants was 36.5 years (SD = 7.5 years). Most had educated up to G.C.E. O/L, (33.7%) Additionally, 24 (13.3%) had postgraduate qualifications. Only 6.1% had working experience of over 20 years, while most (32%) had experience of 1-5 years.

Table 1: Socio-demographic profile

Socio-demographic characteristic		N	%
Category of Health care workers	Consultants	10	5.5
	Medical officers	39	21.5
	Nursing officers	37	20.5
	Minor staff	95	52.5
	Total	181	100
Age categories (%)	20-30 yrs	52	28.7
	31-40 yrs	70	38.7
	41-50 yrs	53	29.3
	51-60 yrs	6	3.3
	Total	181	100
Marital status	Single	43	23.8
	Married	131	72.3
	No response	7	3.9
	Total	181	100
Education (%)	Grade 1-5	3	1.7
	Grade 6-10	11	6.1
	G.C.E. O/L	61	33.7
	G.C.E. A/L	37	20.4
	Degree	45	24.9
	Postgraduate	24	13.3
	Total	181	100
	< 1year	14	7.7
	1-5 years	58	32.0

Experience as a Health care worker	6-10 years	51	28.2
	11-20 years	47	26.0
	>20 years	11	6.1
Total		181	100

Knowledge of OE, PEP and hepatitis B

Among all healthcare workers, 56 (30.9%) had experienced an occupational injury, while 53 (94.6%) of those reported needle-stick injuries. Additionally, 10 (17.9%) HCW had exposures through splashes to mucous membranes. However, out of all exposures, 20 (35%) had received PEP services, and 37 (22%) had participated in a PEP awareness programme.

Hepatitis B vaccination

A total of 26 participants (14.4%) were not vaccinated against hepatitis B while the majority 83 (45.9%) had completed the full hepatitis B vaccination series.

Only 19 (10.5%) knew their hepatitis B surface antibody levels following vaccination.

Common reasons for not testing hepatitis B antibody were lack of awareness about the test itself (20.4%) and unaware of the location for testing (33.7%).

Table 2: Occupational exposure by HCWs and Knowledge of hepatitis B

Variable		N	%	Valid%
Ever had occupational exposure	Yes	56	30.9	30.9
	No	125	69.1	69.1
	Total	181	100	100
Needlestick injury	Yes	53	29.3	94.6
	No	03	1.6	5.6
	No response	125	69.1	00
	Total	181	100	100
Splash to a mucus membrane	Yes	10	5.4	17.9
	No	46	24.5	82.1
	No response	125	69.1	00
	Total	181	100	100
Attended PEP services After OE	Yes	20	11.0	35.7
	No	36	19.9	64.3
	No response	125	69.1	00
Total		181	100	100

cont

Variable		N	%	Valid%
Participated PEP awareness program	Yes	37	20.4	22
	No	131	72.4	78
	No response	13	7.2	00
	Total	181	100	100
Variable		N	%	
Hepatitis B vaccination	No	26	14.4	
	One dose	30	16.6	
	Two doses	31	17.0	
	Full dose	83	45.9	
	Don't Know	3	1.7	
	Not responded	8	4.4	
	Total	181	100	
Hep B antibody level	Yes	19	10.5	
	No	121	66.9	
	Tested & unaware of results	3	1.7	
	Not responded	38	21	
	Total	181	100	
Variable		Yes	%	
Reason for not check antibody level	Not aware about antibody testing	37	20.4	
	No proper place in hospital for testing	61	33.7	
	Expensive in the private sector	5	2.8	
	Assumed it was not necessary	16	8.8	
	Total	181	100	

Knowledge of OE and PEP

First aid after OE:

Only 104 (57.5%) participants knew the correct first aid after a needle stick injury.

Obtaining PEP:

The majority (77.9%) mentioned that the STD clinic was the place to obtain PEP, and the second option selected by the participants was the Emergency Treatment Unit (ETU), (19.3%).

The majority, (65.2%), had the knowledge that PEP should be started as soon as possible, whereas 7.2% were not aware of the optimal time to start PEP.

Out of all HCWs, 41 (22.7%) knew the correct procedure following OE, in which HCWs go to the STD clinic with the source's blood specimen. However, 47 (26%) suggested that both sources' and HCWs' blood specimens need to be sent to the STD clinic.

Table 3: Knowledge of OE and PEP

Variable		N	%
Immediate action after OE	Squeeze the blood	39	21.5
	Wash with soap & water	104	57.5
	Wash with Betadine	14	7.7
	Inform ICU	16	8.8
	Don't know	1	0.6
	Not responded	7	3.9
	Total	181	100
Place for PEP	Pharmacy	1	0.6
	STD clinic	141	77.9
	ETU	35	19.3
	IUC	2	1.1
	Surgical theatre	3	1.7
	Don't know	3	1.7
	Total response	185	
Correct time to start PEP	No specific time	3	1.7
	Soon as possible	118	65.2
	24-72 hours	24	13.3
	3-7 days	11	6.1
	Don't know	13	7.2
	Not responded	12	6.5
	Total	181	100
Action after OE	Send the patient's blood	41	22.7
	Send HCW's blood	35	19.2
	Send Patients & HCW blood	47	26
	HCW visit with pt's blood	41	22.7
	Don't know	4	2.2
	Not responded	13	7.2
	Total	181	100
Corrected knowledge on PEP.	Yes	29	16
	No	152	84
	Total	181	100

Barriers and improvements in PEP services

Table 4 : Barriers and suggestions to improve PEP services.

Variable		Yes	%
Barriers to utilizing PEP services	Low awareness among HCWs	104	57.5
	Busy work and lack of time	79	43.6
	Restricted hours of PEP services	22	12.2
	Unfriendly staff	13	7.2
	Must attend two places	33	18.2
Suggestions to improve PEP services	Annual PEP awareness program	118	65.2
	PEP workshop at the first appointment of HCWs.	91	50.3
	Full-time MO for PEP services	10	5.5
	Provide adequate PEP	76	42
	Test all HCWs for Hep B antibody	45	24.9

The most common reason for underutilization of PEP services was low awareness among health care workers 104(57.5%). Busy work Schedules and lack of available time to attend PEP services were reported by 79 participants (43.6%).

The most common suggestion to improve PEP services was to conduct an annual PEP awareness programme in the hospital (65.2%), and (50.3%) suggested arranging PEP workshops at the first appointment of HCWs.

Association between knowledge of OE & PEP and associated factors.

Correct knowledge of OE and PEP was significantly associated with being a medical officer ($P = 0.000$), previous participation in a PEP program ($P = 0.001$), and having previous exposure to infectious material ($P = 0.0000$).

Correct knowledge was not associated with duration of work ($P=0.262$) or age of the HCWs ($P=0.548$)

A binomial logistic regression model assessed the association between adequate PEP knowledge and other independent variables.

Study participants who had been medical officers had 6.5 Odds (SE-0.476, $P=0.000$, 95% CI 2.566-16.658) and participated in the PEP workshop had 5.1 Odds (SE 0.487, $P=0.001$, 95% CI 1.945-13.117) of correct knowledge of PEP compared to other groups.

However, OE to infectious material did not positively correlate with correct knowledge of PEP. (SE 0.5550, $P=0.071$, OR 2.702, 95% CL 0.920-7.941)

Table 5: Associated factors with adequate knowledge on OE and PEP

Variable		Adequate knowledge		P Value
		Yes	No	
Being Medical officers	Yes	15	24	0.000
	No	14	128	
	Total	29	152	
Ever had OE to infective material	Yes	17	39	0.000
	No	12	113	
	Total	29	152	
Ever participated in a PEP workshop	Yes	13	24	0.001
	No	15	116	
	No response	1	12	
	Total	29	152	
	Total	29	152	
Duration of work as HCWs	<1 year	1	13	0.262
	2-10 years	22	87	
	11-20 years	6	41	
	>21 years	0	7	
	No response	0	4	
	Total	29	152	
	Total	29	152	
Age	25 years	0	2	0.548
	25-34 yrs	15	64	
	< 35 yrs	14	86	
	Total	29	152	

Discussion

In this study 56 (30.9%) HCW had OE to infectious materials and out of them, only 20 (35.7%) had participated in PEP services. The number OE incidents was low compared to other studies done in Sri Lanka. (10–12) but the participation for PEP services is higher in our study compared to other studies, which was around 7%-17%. (10,11)

In our study, only 16% had Correct knowledge of OE and PEP, and a similar level of good knowledge (19%) was detected in a study conducted among HCWs in the Kegalle. (10) In our study, 57.5% (n=104) knew the proper first aid for exposure to infectious material, and a similar level of response was shown in a study among dental surgeons (55%) (11) and a study among HCWs in Kegalle (67.4%). (10)

In our study, medical officers demonstrated good knowledge compared to other professional groups; however, a study conducted in Kegalle reported that nurses also possessed a good knowledge. (10) Participation in a PEP workshop is positively associated with correct knowledge of OE and PEP. In our study, work duration was not associated with correct knowledge of OE and PEP. Whereas the study in Kegalle found higher knowledge among those with 6–10 years of experience, which then declined gradually. (10)

The most significant barrier to utilising PEP services was a lack of awareness among HCWs. The majority recommended that PEP workshops be held annually and during the first appointment of HCW.

Nearly half of the participants (45.9%) received the full course of hepatitis B vaccination; however, only 10.5% were aware of their hepatitis B surface antibody level. The main reason for the low antibody testing rate was the lack of a designated place in the hospital; currently, the test is done at the Medical Research Institute in Colombo. Compared to HIV, Hepatitis B has a high risk of acquisition following OE, and complete protection can be obtained by vaccination. Even with full vaccination, only 90% achieve complete protection, (13) and a study conducted in Sri Lanka shows that a proportion of vaccinated HCWs, 90%, had an adequate vaccination

response. (14) The rest need booster doses and follow-up for antibody titres. (15) Nearly one quarter (24.9%) requested Hepatitis B antibody testing as an option for improving PEP services.

There are a few limitations in this study. The study population was only the health care workers in District General Hospital of Kilinochchi therefore results are not generalized to Sri Lanka as social and cultural factors in Kilinochchi district is different to the rest of Sri Lanka.

In this study recall period was not specific for OE; therefore, participants may have recall bias of OE to infectious material, as more than one-fourth had worked over 10 years as health care workers.

Conclusion

This study showed that knowledge of OE and PEP among healthcare workers in DGH -Kilinochchi was unsatisfactory. Correct knowledge is positively associated with medical officers and participated in the PEP workshop

STD clinics can implement workshops to enhance knowledge on PEP. Further hepatitis B antibody testing is vital, and booster vaccination for non-responding HCWs need to be arranged.

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