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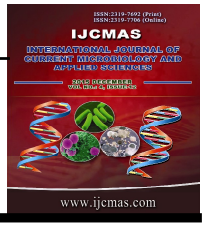


**Original Research Article**

# A Cross Sectional Study Regarding Knowledge, Attitude and Practice of Post Exposure Prophylaxis on Occupational/Accidental Exposure Among Health Care Workers/Providers at a Tertiary Care Hospital in Western Uttar Pradesh of India

**Amit A. Rangari***

Department of Microbiology, Muzaffarnagar Medical College and Hospital, Muzaffarnagar (U.P.) India
**Corresponding author*

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Health Care Workers, Post Exposure Prophylaxis, Universal Safety Precautions

**A B S T R A C T**

Occupational Exposure refers to exposure to potential blood-borne infections that may occur in healthcare settings during performance of job duties. World Health Organization estimates that 3 million percutaneous exposures occur annually among 35 million workers (HCW) globally, with over 90% occurring in resource-constrained countries. In addition, such exposures can cause tremendous anxiety, fear and stress among HCW that can have a negative impact on the HCW while providing their services. Universal safety precautions deals with measures to prevent exposure of health care workers to source of infection. While post exposure prophylaxis deals with prophylactic measures taken to prevent establishment of infection after occupational/accidental exposure of health care worker/provider to infectious source material has occurred.Present study aimed to examine and study the knowledge, attitude and practice of post exposure prophylaxis on occupational/accidental exposure among health care workers/providers at a tertiary care hospital in western Uttar Pradesh. 240 HCW volunteers were divided in groups of 10-20 in number and questionnaire were distributed. Answers revealed , 23(9.5%) volunteers had undergone training regarding PEP. Majority were unaware of PEP, thus had casual/careless attitude. 56(23.33%) volunteers gave history of occupational/accidental exposure. In 0(0%) cases of occupational/accidental exposure source code & exposure code was initiated. neither were brought in notice of hospital superintendent and thus as a result neither any record of HCW occupational/accidental exposure in hospital recorded and maintained. 2(3.5%) volunteers with occupational/accidental exposure took PEP on their own that too after 48 hours. Training directed towards proper knowledge and adherence to USP and PEP can bring about a positive change resulting in willingness of HCW to provide care for patients with HIV infection and other blood borne pathogens.

## Introduction

Occupational Exposure refers to exposure to potential blood-borne infections (HIV, HBV and HCV) that may occur in healthcare settings during performance of job duties **(**National AIDS Control Organization 2015**)**. Occupational exposure to blood or other

body fluids in healthcare settings constitutes a small but significant risk of transmission of HIV and other blood-borne pathogens (Sagoe-Moses C et.al., 2001). The risk of blood borne pathogen transmission following occupational exposure depends on a variety of factors that include source patient factors (e.g., titer of virus in the source patient's blood/body fluid), the type of injury and quantity of blood/body fluid transferred to the healthcare workers (HCW) during the exposure, and the HCW's existing immune status. The greatest risk of infection transmission is through percutaneous exposure to infected blood. Nevertheless, transmission of HBV, HCV, or HIV after mucous membrane or non-intact skin exposure to blood has also been reported. The risk of transmission of these pathogens through mucocutaneous exposure is considered lower than the risk associated with a percutaneous exposure. In Needle stick exposure: risk of acquiring HIV is 0.09-0.3 %, risk of acquiring HBV is 9-30% and risk of acquiring HCV is 1-10 % (Gaidhan A e et.al., 2008).

In addition, such occupational exposures can cause tremendous anxiety, fear and stress among HCW that can have a negative impact not only on the HCW, but also their families and colleagues (de lTX et.al., 1998). The World Health Organization estimates that 3 million percutaneous exposures occur annually among 35 million HCW globally, with over 90% occurring in resource-constrained countries(Pruss-Ustun A et.al., 2005). As a consequence of these exposures, an estimated 66,000 hepatitis B, 16,000 hepatitis C, and up to 1000 HIV infections occur each year. An estimated 385,000 percutaneous injuries (i.e., needle sticks, cuts, punctures and other injuries with sharp objects) occur in U.S. occupational transmission of bloodborne pathogens requires a diversified approach to reduce blood contact and percutaneous injuries including improved engineering controls (e.g., safer medical devices), work practices (e.g., technique changes to reduce handling of sharps), and the use of personal protective equipment (e.g., impervious materials for barrier precautions). Universal precautions are the infection control techniques that were recommended following the AIDS outbreak in the 1980s. Essentially it means that every patient is treated as if they are infected and therefore precautions are taken to minimize risk. All health care workers should routinely use appropriate barrier precautions to prevent skin and mucous membrane exposure during contact with any patient's blood or body fluids that require universal precautions(Centers for Disease Control and Prevention, 1987).

Universal safety precautions deals with measures to prevent exposure of health care workers to source of infection(Centers for Disease Control and Prevention, 2007). While post exposure prophylaxis deals with prophylactic measures taken to prevent establishment of infection after occupational/accidental exposure of health care worker/provider to infectious source material has occurred. In case of accidental exposure, health care workers/providers must know: a). whom to officially report(designated hospital authority) the incident inorder to get necessary benefits immediately, b).depending on source code and exposure code when to initiate PEP and c).limitations of PEP(specially regarding seroconversion, side effects, adverse effects).

The infections acquired through the occupational route are largely preventable through strict infection control, universal precautions, use of safe devices, proper waste disposal, immunization against

hepatitis B virus, and prompt management of exposures including the use of post-exposure prophylaxis (PEP) for HIV (estimated to reduce HIV seroconversion by 81%) (Cardo DM et.al., 1997). The use of these strategies are now the standard of care in most high income nations and have reduced the risk of HIV and hepatitis transmission among HCW. In resource-constrained settings where the largest burden of HIV and hepatitis exist, however, there is limited surveillance and data regarding health care-related occupational exposures and the use of PEP. Furthermore, a lack of personal protective equipment (PPE), availability of safe devices, proper disposal of sharps and waste, and a high demand for injections place HCW in these settings at high risk for occupational exposures and infection (Sagoe-Moses C et.al., 2001).

In resource-constrained settings, HCWs over estimated their risk of acquiring HIV infection following needle stick injury, exposure of muco-cutaneous membrane and intact skin to infected blood and body fluids (Owotade FJ et.al., 2003). Having access to health care services can be a problem for PLWHA (People Living With HIV/AIDS) because health scenarios themselves can be a source of stigma. Research from early studies on the pandemic evidenced that health care providers fear of contagion and death had negative effects on their attitudes toward and treatment of PLWHA . Still today, some health professionals avoid treating PLWHA and evidence of stigma continues to emerge from survey research and anecdotal reports, some studies have documented the unavailability of health services providers to treat PLWHA . AIDS stigma has been documented among health services providers such as doctors, nurses, psychologists, and social workers. It has detrimental effects of the services provided and the lives of people living with HIV/AIDS (Ruiz-Torres et.al.,2007).

There are few published data that has addressed the issue of occupational exposures among HCWs. The present study aims to examine and study the knowledge, attitude and practice of post exposure prophylaxis on occupational/accidental exposure among health care workers/providers at a tertiary care hospital in western Uttar Pradesh. To assess the "training needs" regarding post exposure prophylaxis on occupational/accidental exposure , among health care workers/providers at a tertiary care hospital in western Uttar Pradesh, as they are at increased risk of acquiring infections.

## Materials and Methods

This cross sectional study of 6 months duration was conducted at a tertiary care hospital and Medical College in western Uttar Pradesh of India. Before beginning the study clearance from Institutional Ethics Committee (IEC) was obtained. Verbal informed consent from subjects involved was obtained. Study included as subjects all Health care workers/providers (who volunteered for the study)working in Microbiology, Pathology, Biochemistry, Surgery, orthopaedics, anaesthesia, O.B.G.Y., ENT, Casualty, Dentistry, Medicine, Paediatrics, etc who come in contact with patient/client's body fluid / organ and are at a greater risk of acquiring blood borne infections . Study group included 240 HCW volunteers who were divided into groups as A). 60 Doctors, B). 60 Nursing staff, C). 60 Attendant & Technicians and D). 60 Resident doctors , Interns & MBBS Students. Personal individual identity of human subject volunteers involved was kept anonymous. Subjects i.e. health care workers/providers who volunteered for the project were divided in groups of 10-20 in number and

questionnaire were distributed. Forty minutes were allotted to get the answers for forty questions. Subjects were explained the questioner in local language if the subjects demanded so. Results were'nt linked to personal individual identity of a subject. Subjects were recognised as from group of either Doctors, Nursing staff, Attendant & technicians, Resident doctors, Interns & MBBS student only. Data was collected by using pre-designed , pre-tested , semi-structured questionnaire. The research protocol and questionnaire was approved by the Institutional Ethical Review Board.

The information to be gathered regarding : 1) demographic characteristics and working conditions; 2) daily injection practices; 3) education and training at the hospital;4) Health care workers/providers' knowledge ,attitude and practices regarding PEP.

After evaluating the knowledge, attitude and practice of subject's regarding post exposure prophylaxis on accidental occupational exposure, need for training the heath care worker's/provider's(regarding post exposure prophylaxis on accidental occupational exposure) was ascertained and necessary recommendations guiding the subjects was made. Results of study was compared with results of study conducted in other tertiary care hospitals.

## Results and Discussion

A total of 240 HCW participated as volunteers in our study. Out of these only 23(9.5%) volunteers had undergone training regarding PEP. Only 57(23.75%) had prior HBsAg immunization done. Majority of the volunteers were unaware of PEP. And thus had casual/careless attitude towards PEP. 56(23.33%) volunteers gave history of occupational/accidental exposure. Source Code & Exposure Code required for assessing the need and type of PEP required was not at all initiated in any case(0%) of occupational/accidental exposure. Out of 56/240 HCW who participated as volunteers in our study, not a single case(0%) of occupational/accidental exposure was brought in notice of hospital superintendent and thus as a result neither any record of HCW occupational/accidental exposure in hospital recorded and maintained. Only 2(3.5%) volunteers out of 56 occupational/accidental exposure cases took PEP on their own that too after 48 hours of exposure. Our prospective study at a rural teaching hospital in India highlights the casual to careless attitude towards PEP following occupational exposures among HCW. While recapping contributed to exposures, handling sharps such as IV needles and sutures during a procedure or after a procedure were the most common reason for an exposure. Hepatitis B vaccination, which was highest among doctors and lowest among ancillary hospital staff.

Only a few studies have been published regarding occupational exposures in India. A study at a private non-teaching hospital in Mumbai found that over a six-year period, 380 needlestick injuries were reported (Mehta A et.al., 2005). Nurses reported the greatest number of exposures with IV line insertion being the most common activity during exposure. In a cross-sectional survey of 266 HCW in rural north India working in non-governmental health settings of 115 beds or less, nurses again had the highest reported number of exposures in the past year (Kermode M et.al., 2005). There are few studies regarding incidence of occupational exposures or PEP utilization in resource-constrained settings. A cross-sectional survey of Nigerian HCW at a teaching hospital found that 27% of HCWs had a needlestick in the past year with a rate

of 0.6/PY (Adegboye AA et.al., 1994). The majority were dentists (100%) and surgeons (81%), followed by other physicians (31%), and nursing staff (31%). They reported patient movement, recapping, and accidental stick by colleague to be the major reasons for HCW exposure. A recent survey of HCW in Kenya found that there was low uptake of PEP (4% of needlestick injuries), and this was largely attributed to HCW fear of getting HIV tested as well as the perception that needlestick exposures were low risk for HIV (Taegtmeyer M et.al., 2008). In a small study in Malawi, PEP was reportedly underutilized with 19 of 29 HCW initiating PEP (van Oosterhout JJ et.al., 2007). Many of these HCW were nurses and one of the reasons for low use of PEP was lack of awareness and fear of getting HIV tested.

In a study conducted in the Government Multi-Specialty Hospital, Sector16, Chandigarh**(**Rajinder Kaur et.al., 2008**)** the mean knowledge score regarding universal precautions was calculated to be 60.40 and that of practice score was 83.01. These scores were almost directly proportionate to year of the training of students. Still, the performance of students in knowledge score was quite low as no student could get marks more than 80.

A research on needle stick injuries (NSI) done in Taiwan by Judith Shu-Chu Shiao, et al concluded that the majority (70.1%) of NSI occurred in the patient's room. Hollow-bored needles contributed to half (219/438) of the NSIs of which 86.8% were syringe needles. Just over half (53.2%) of those items involved in NSIs had been used on patients. Of the hollow-bored needles involved in NSIs, 21.5% had been used on a patient with an infectious disease (Judith Shu-Chu Shiao et.al., 2002).

In their study conducted at a teaching hospital in Pune, India Amita Gupta et.al, among 1,955 HCW employed between January 2003 and December 2005, 557 occupational exposures were reported by 484 HCW. Nearly half of the reported exposures came from the Medicine and Obstetrics/Gynecology departments. The greatest number of exposures was reported among interns (53.1%) (i.e. persons in their first year post-medical school), followed by residents (22.8%), who were in years 2 through 5 postmedical school. Sixty-two HCW reported repeat exposures during the study period; most were either interns (69.3%) or residents (19.3%). Overall average annual incidence of reported exposures among HCW was 9.5 exposures per 100 person-years (PY). Interns had the highest annual incidence at 47.0/100 PY. Ninety-five percent of HCW reported their exposure within 24 hours; the median time between exposure and reporting was 30 minutes. Fifty-five percent of HCW reported using PPE at the time of their exposure. Gloves were used in 50.1% of all exposures, while 9.3% reported use of a mask. Baseline Hepatitis B vaccination rate was 79.1%. Housestaff were more likely to have been vaccinated than others (Amita Gupta et.al., 2008)

In the setting of HCW education and a structured PEP program, the reported number of percutaneous and high risk exposures decreased over time and the utilization and appropriate implementation of PEP increased over time. Therefore we recommend the following measures:- 1.Conducting training programs for all HCW, 2.Vaccination of all health care professionals, 3.Proper handling of sharps, 4. Proper waste disposal as per Bio-Medical Waste management Government rule, 5.Use of gloves and personal protective devises irrespective of status of the patient, 6.Acting

immediately(within 2 hours) after any accidental exposure to blood/body fluids after ascertaining the Source Code &Exposure Code, 6.Reporting the incident and maintain the record.

**Table.1** Training Status Regarding PEP of HCW Volunteers

| Study Group | Training Status :-Yes | Training Status :-No |
|---|---|---|
| Doctors: 60 volunteers. | 15 | 45 |
| Nursing staff: 60 volunteers. | 0 | 60 |
| Attendant & Technicians: 60 volunteers. | 0 | 60 |
| Resident doctors , Interns & MBBS Students: 60 volunteers | 8 | 52 |

**Table.2** Source of Information Regarding PEP of HCW Volunteers

| Study Group | Awareness camp | Internet | Friends and Colleagues | Mass media | Books | Lecture, seminar and workshop |
|---|---|---|---|---|---|---|
| Doctors: 60 volunteers. | 0 | 50 | 38 | 45 | 37 | 55 |
| Nursing staff: 60 volunteers. | 0 | 20 | 30 | 25 | 22 | 34 |
| Attendant & Technicians: 60 volunteers. | 0 | 0 | 10 | 0 | 0 | 0 |
| Resident doctors , Interns & MBBS Students: 60 volunteers | 0 | 45 | 20 | 31 | 50 | 43 |

**Table.3** Attitude Regarding PEP of HCW Volunteers

| Study Group | Positive | Casual approach | Careless |
|---|---|---|---|
| Doctors: 60 volunteers. | 5 | 25 | 30 |
| Nursing staff: 60 volunteers. | 4 | 21 | 35 |
| Attendant & Technicians: 60 volunteers. | 3 | 17 | 40 |
| Resident doctors , Interns & MBBS Students: 60 volunteers | 12 | 30 | 18 |

**Table.4** Prior HBsAg Immunization History of HCW Volunteers

| Study Group | Yes | No |
|---|---|---|
| **Doctors: 60 volunteers.** | 38 | 22 |
| **Nursing staff: 60 volunteers.** | 8 | 52 |
| **Attendant & Technicians: 60 volunteers.** | 0 | 60 |
| **Resident doctors , Interns & MBBS Students: 60 volunteers** | 11 | 49 |

**Table.5** Occupational/Accidental Exposure Incident Brought into Notice and Documented with Hospital Superintendent(Working Head of Hospital)

| Study Group | Total incident of Occupational/accidental exposure | Occupational/accidental exposure incident brought into notice with hospital superintendent. | | Occupational/accidental exposure incident documented with hospital superintendent | |
|---|---|---|---|---|---|
| | | Yes | No | Yes | No |
| **Doctors: 60 volunteers.** | **5** | **0** | **5** | **0** | **5** |
| **Nursing staff: 60 volunteers.** | **32** | **0** | **32** | **0** | **32** |
| **Attendant & Technicians: 60 volunteers.** | **7** | **0** | **7** | **0** | **7** |
| **Resident doctors , Interns & MBBS Students: 60 volunteers** | **12** | **0** | **12** | **0** | **12** |

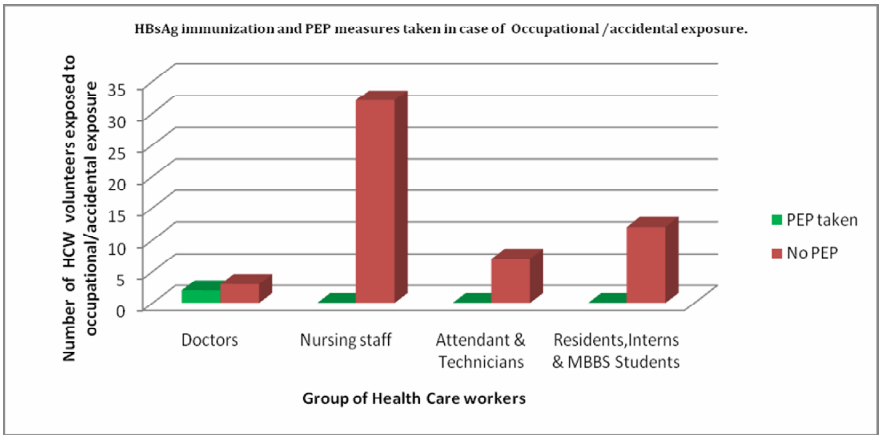
**Table.6** HBsAg Immunization and PEP Measures taken in Case of Occupational /Accidental Exposure

| Study Group | Total incident of Occupational/accidental exposure | Yes | No |
|---|---|---|---|
| **Doctors: 60 volunteers.** | **5** | **2** | **3** |
| **Nursing staff: 60 volunteers.** | **32** | **0** | **32** |
| **Attendant & Technicians: 60 volunteers.** | **7** | **0** | **7** |
| **Resident doctors , Interns & MBBS Students: 60 volunteers** | **12** | **0** | **12** |

**Table.7** PEP Initiated after what Time

| Occupational/Accidental exposure cases | No PEP | 2Hrs | 48Hrs | 72Hrs | Don't know |
|---|---|---|---|---|---|
| **Doctors: 5 volunteers.** | **3** | **0** | **2** | **0** | **0** |
| **Nursing staff:** 32 **volunteers.** | **32** | **0** | **0** | **0** | **0** |
| **Attendant & Technicians:** 7 **volunteers.** | **7** | **0** | **0** | **0** | **0** |
| **Resident doctors , Interns & MBBS Students:** 12 **volunteers** | **12** | **0** | **0** | **0** | **0** |

**Figure.1** HBsAg Immunization and PEP Measures taken in Case of Occupational /Accidental Exposure




Training favourably affects HCWs' willingness to care for HIV-positive patients and their assessed risk of developing occupational blood borne infection (Diekema DJ et.al., 1995). A proper knowledge and adherence to USP and PEP can bring about a Positive change resulting in willingness of HCW to provide care for patients with HIV infection and other blood borne pathogens.

Our study suggests that a comprehensive program covering universal precautions, procedural training and sharps handling is necessary for HCW. Improved use of PPE, access to reliable rapid HIV testing, introduction of safer medical devices for procedures, and continued education regarding appropriate use of PEP are necessary to ensure optimal HCW safety in resource-limited settings such as India.

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## References

Adegboye AA, Moss GB, Soyinka F, Kreiss JK. 1994: The epidemiology of needlestick and sharp instrument accidents in a Nigerian hospital. *Infect Control Hosp Epidemiol*; 15(1):27-31.

Amita Gupta,Shuchi Anand, Jayagowri Sastry, Anandini Krisagar, Anita Basavaraj, Shreepad M Bhat, Nikhil Gupte, Robert C Bollinger and Arjun L Kakrani.2008: High risk for occupational exposure to HIV and utilization of post-exposure prophylaxis in a teaching hospital in Pune, India. *BMC Infectious Diseases*, 8:142.

Cardo DM, Culver DH, Ciesielski CA, Srivastava PU, Marcus R, Abiteboul D, Heptonstall J, Ippolito G, Lot F, McKibben PS, Bell DM. 1997 : A case-control study of HIV seroconversion in health care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. *N Engl J Med*, 337(21):1485-1490.

Centers for Disease Control and Prevention(CDC), 2007. Guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings.

Centers for Disease Control and Prevention(CDC), 1987. Universal Precautions for Prevention of Transmission of HIV and Other Bloodborne Infections.

de lTX, Dufresne MD, Alfandari S, Fontier C, Sobazek A, Valette M, Ajana F, Gerard Y, Maulin L, Bourez JM, Baclet V, Senneville E, Vermersh A, Mouton Y. 1998: Tolerance, compliance and psychological consequences of post-exposure prophylaxis in health-care workers. *Int J STD AIDS*, 9(10):591-594.

Diekema DJ, Schuldt SS, Albanese MA, Doebbeling BN. November 1995. Universal precautions training of preclinical students: impact on knowledge, attitudes, and compliance. Journal of Preventive medicine;24(6):580-5.

Gaidhane A, Syed Zahiruddin Q, Khatib N, Shrivastav T, Johrapurkar S. 2008. *Occupational Exposure To HIV And Practices Of Universal Safety Precautions Among Residents Doctors*. The Internet Journal of Health. 8 (2). 1-7.

Judith Shu-Chu Shiao, Mary-Louise Mclaws, Kun-Yen Huang, Yueliang Leon Guo. April 2002. Student Nurses in Taiwan at High Risk for Needlestick Injuries. The official journal of the American college of epidemiology.;12(3): Pages 197-201.

Kermode M, Jolley D, Langkham B, Thomas MS, Crofts N. 2005; Occupational exposure to blood and risk of bloodborne virus infection among health care workers in rural north Indian health care settings. *Am J Infect Control*; 33(1):34-41.

Mehta A, Rodrigues C, Ghag S, Bavi P, Shenai S, Dastur F. 2005 : Needlestick injuries in a tertiary care centre in Mumbai, India. *J Hosp Infect*, 60(4):368-373.

National AIDS Control Organization, http://www. naco.gov.in/NACO/ National_AIDS_Control_Program/PEP_full/ Updated On:-18 Nov, 2015.

Owotade FJ, Ogunbodede EO, Sowande OA. 2003 Oct : HIV/AIDS pandemic and surgical practice in a Nigerian teaching hospital. Trop Doct.;33(4):228-31

Pruss-Ustun A, Rapiti E, Hutin Y. 2005: Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med*, 48(6):482-490.

Rajinder Kaur, Baljit Kaur, Indarjit Walia. October 2008. Knowledge, Attitude and Practice Regarding Universal Precautions among Nursing Students Nursing and Midwifery Research Journal, Vol-4, No. 4.

Ruiz-Torres Y, Cintrón-Bou F N., Varas-Díaz N . 2007. AIDS-Related Stigma and Health Professionals in Puerto Rico. Interamerican Journal of Psychology - 2007, Vol. 41,Num. 1 pp. 49-56

Sagoe-Moses C, Pearson RD, Perry J, Jagger J. 2001: Risks to health care workers in developing countries. *N Engl J Med*, 345(7):538-541.

Taegtmeyer M, Suckling RM, Nguku PM, Meredith C, Kibaru J, Chakaya JM, Muchela H, Gilks CF. 2008: Working with risk: occupational safety issues among healthcare workers in Kenya. *AIDS Care*, 20(3):304-310.

van Oosterhout JJ, Nyirenda M, Beadsworth MB, Kanyangalika JK, Kumwenda JJ, Zijlstra EE. 2007: Challenges in HIV post-exposure prophylaxis for occupational injuries in a large teaching hospital in Malawi. *Trop Doct*; 37(1):4-6.