



ASSESSMENT OF UNIVERSAL PRECAUTIONS NORMS FOLLOWED BY RESIDENT DOCTORS OF BPKIHS AT EASTERN NEPAL.

Medicine

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ABSTRACT

Introduction: Universal precautions are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources to a susceptible host. The CDC guideline recommends Universal Precautions for the care of all patients, regardless of their diagnosis or presumed infection status. It is mandatory to treat all blood and other potentially infectious materials with appropriate precautions.

Objectives: To assess components of universal precaution and the associated factors for not practicing the rules of universal precaution and also to assess the knowledge and practice regarding universal precaution among Resident doctors of BPKIHS.

Methodology: It is cross-sectional survey, conducted in BPKIHS in tertiary hospital teaching hospital Dharan in 2016. A total of 275 resident doctors were interviewed by trained investigators after getting verbal consent with the help of self-designed questionnaire.

Results: Out of 275 resident doctors, 94% participants practiced hand washing if contacted with different patients, 91% practiced hand washing after taking of gloves whereas 94% practice hand washing after contacted with blood and body fluid. 93% agreed to wear gloves while drawing of body fluid whereas 91% participants agreed to change gloves if contacted with different patients. 63% used gloves always, 35% used gloves sometimes and 3% never used gloves. 52% participants used personal protective equipment

55% participants exposed to body fluid. 63% participants faced needle stick injury, among whom 38% had one time injury, 22% had two times whereas 21% had more than 3 times injury. 37% faced needle stick during recapping syringe, 33% during securing IV cannulation, whereas 14% during suturing. 77% took prophylaxis vaccination whereas 23% have not vaccinated.

Conclusion: Careful adherence to universal precautions can protect both health personal and patients from infections through proper execution of norms of universal precaution.

KEYWORDS

Standard precaution, Resident doctors, Nosocomial infection.

Introduction:

Universal Precautions were initially developed in 1987 by the Centers for Disease Control (CDC) and Prevention in the United States and in 1989 by the Bureau of Communicable Disease Epidemiology in Canada. The CDC guideline recommends Universal Precautions for the care of all patients, regardless of their diagnosis or presumed infection status. It applies to blood, all body fluids, secretions, and excretions (except sweat) regardless of whether or not they contain visible blood, non-intact skin and mucous membranes. These are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

Universal precautions are designed to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized sources to a susceptible host. They are the basic level of infection control precaution. They are designed to protect health workers from exposure to diseases spread by Blood and other Body fluids. It is applied universally in caring for all patients. It applies to blood, all body fluids, secretions, and excretions (except sweat). It includes: hand washing, Personal protective Equipment. (Proper use of gloves, face mask, cap, goggles. Gown, foot wear etc.), decontamination of equipment and devices, proper use and disposal of needles, waste material materials.

Universal Precautions includes that all human body fluids should be considered potentially infectious materials. It is mandatory to treat all blood and other potentially infectious materials with appropriate

precautions such as: Use gloves, masks, and gowns if blood and body fluids are anticipated. It recommends the uses of Personal Protective Equipment (PPE) are equally important for protection of patients and health personal thus minimize the transmission of infection between health care providers and patients.

Standard precautions (recommendation issued by CDC)—in which all human blood, certain body fluids are treated as if known to be infected with blood-borne pathogens. It is an approach to infection control, to treat all human blood and certain human body fluids as if they were known to be infectious

The protocols of Standard precautions used to maintain an aseptic field and to prevent cross-contamination and cross-infection between health care providers, between health care providers and patients, and between patients. These include the sterilization of instruments and goods; the isolation and disinfection of the immediate clinical environment; the use of sterile disposables; scrubbing, masking, gowning, and gloving; and the proper disposal of contaminated waste.

METHODOLOGY

Study population and sampling

The study is a cross-sectional survey, conducted in BPKIHS Dharan in 2016. A total of 275 resident doctors were interviewed by trained investigators after getting verbal consent to enquire about knowledge and practical aspects of universal precaution with the help of self-designed questionnaire in English and Nepali language. The sample

size was preliminarily estimated on the basis of HRMP records. They were interviewed in the following headings likeage, sex, cast, religion, and components of universal precaution, its knowledge, practice and personal behavior regarding its use and associated factors for not practicing the components of universal precaution by resident doctorsetc.

Data analysis

The data were entered into dBASE IV software and checked regularly by an analyst. The analysis was done in SPSS version 10.0. Setting the level of significance at 5%, 95% Confidence Interval, Odds Ratio, Chi-square, were calculated to know the significance of the variables. Logistic regression was used to identify the factors associated with alcohol use.

Results: The overall sample consisted of 275 resident doctors. Most of the subjects were male (66.5%) and unmarried (66.2 %). The Hindu (94.0%) and Brahmin (54.0%) were dominated the sample. Out of 275 resident doctors, 94% participants practiced hand washing if contacted with different patients, 91% practiced hand washing after taking of gloves whereas 94% practice hand washing after contacted with blood and body fluid.93% agreed to wear gloves while drawing of body fluid whereas 91 % participants agreed to changes gloves if contacted with different patients. 63% used gloves always, 35% used gloves sometimes and 3% never used gloves.52% participants used personal protective equipment 55% participants exposed to body fluid.63 % participants faced needle stick injury, among whom 38% had one time injury, 22% had two times whereas 21 % had more than 3 times injury.37% faced needle stick during recapping syringe, 33% during securing IV cannulation, whereas 14% during suturing. 77% took prophylaxis vaccination whereas 23% have not vaccinated.

Washing hands(if contacted with different patients), 257(93.5%) responded yes, 11(4%) responded no whereas 7(2.5%) was uncertain

Table: 1 Distribution of washing hands (ifcontacted with different patients).

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	257	93.5	93.5	93.5
No	11	4.0	4.0	97.5
Uncertain	7	2.5	2.5	100.0
Total	275	100.0	100.0	

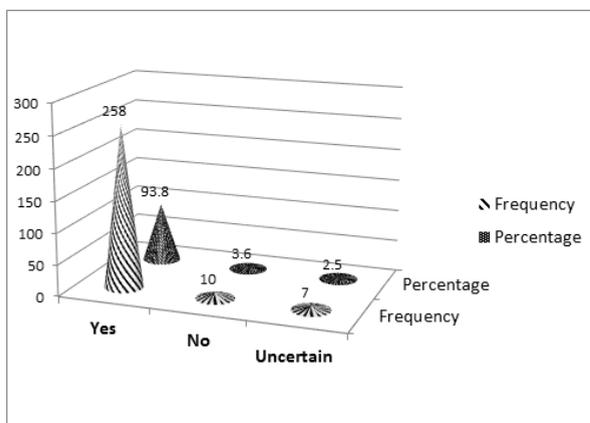
Washing hands (after taking off gloves) 251(91.3%) responded yes, 12(4.4%) responded no whereas 12(4.4%) was uncertain.

Table: 2 Distribution of washing hands after taking off gloves.

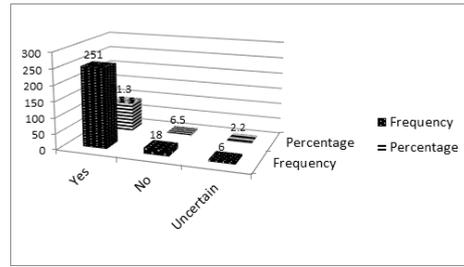
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	251	91.3	91.3	91.3
No	12	4.4	4.4	95.6
Uncertain	12	4.4	4.4	100.0
Total	275	100.0	100.0	

Washing hands immediately aftercontacted any blood and others body fluid(taking off gloves), 258 (94. %) responded yes, 10(4 %) responded no whereas 7(2.5%) was uncertain.

Figure No. 1 shows the distribution of washing hands immediately after contacting any blood and others body fluid (taking off gloves) of participations.



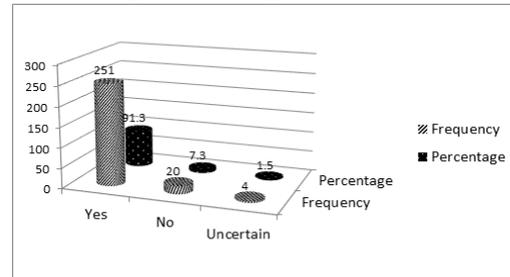
Wearing of gloves while drawing of body fluid: 256 (93%) responded yes, 18(6.5%) responded no whereas 1(o.4%) was uncertain shown in Fig 2



Frequenyand reason for not using gloves:always 173(63%), sometimes 96(35%), never use 6(2.2%) while 108(39%) had no time for wearing the gloves, 76(28%) inconvenient for operation and 56(20.4%) had not genuine reason,

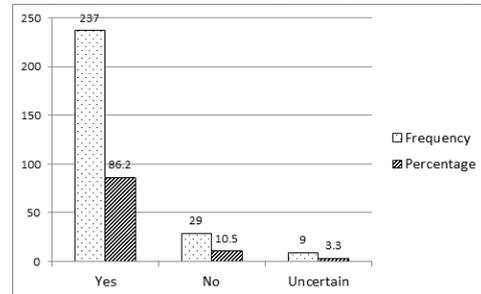
Gloves can be changed(ifcontacted withdifferent patients): 251(91.3% %) responded yes, 20(7.3%) responded no whereas 4(1.5%) was uncertain.

Figure No. 3 shows the frequency and percentage of changing of gloves if contacting with different patients



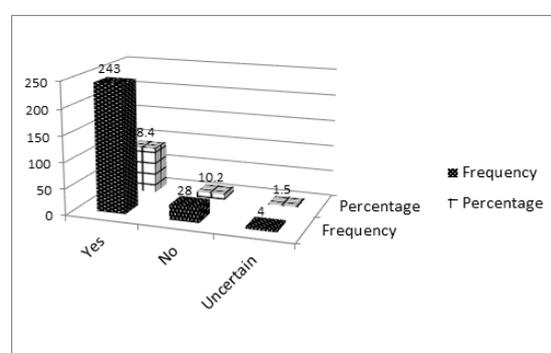
Wearing of face mask(in operation that induce spraying of body fluid): 237(86.2%) responded yes, 29(10.5%) responded no whereas 9(3.3%) was uncertain.

Figure No. 4 shows the frequency and percentage of wearing of face mask (in operation that induce spraying of body fluid)



Wearing of protective suit(in operation that induce spraying of body fluid): 243(88.4%) responded yes, 28(10.2%) responded no whereas 4(1.5%) was uncertain.

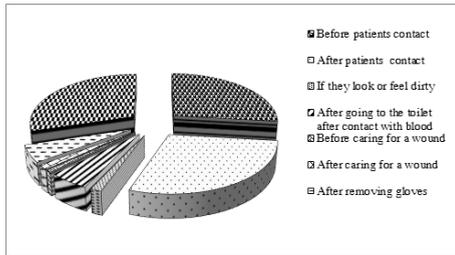
Figure No. 5 shows the frequency and percentage of wearing of protective suit in operation that induce spraying of body fluid



QUESTIONNAIRE ABOUT INFECTION PREVENTION

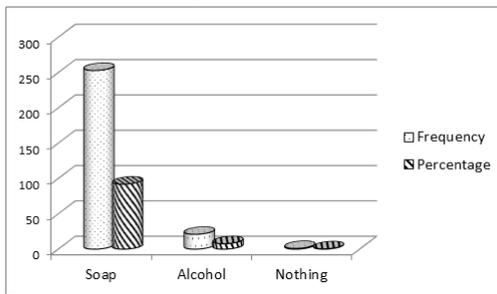
Occasion of hands washing : 74(27%) before patients contacts, after patients contacts 79(29%), after coming to the toilet, after contact with blood and after removal gloves 15(5.5%) and 82(30%) are all.

Figure No.6 shows the percentage of occasion of hands washing



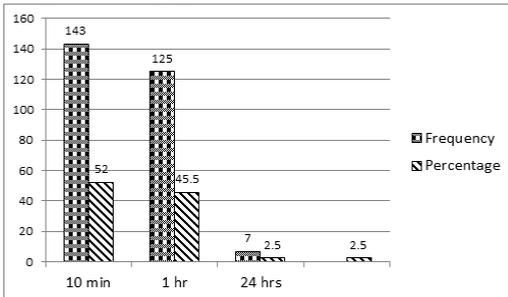
What do you use to wash? : 253(92%) uses soap, 21(8%) uses alcohol to wash hand.

Figure No. 7 shows the frequency and percentage of use to wash



Use of Personal protective equipment(PPE): 143(52%) uses personal protective equipment and 125(45.5%) not used personal protective equipment.

Figure No. 8 shows the frequency and percentage of use of personal protective equipment



Occasion of wearing Personal protective barrier: 156(57%) uses always, 105(38%) uses sometimes whereas 11(4%) uses never

Table: 3 Uses of Personal protective barrier

	Frequency	Percent	Valid Percent	Cumulative Percent
Always	156	56.7	56.7	56.7
Sometimes	105	38.2	38.2	94.9
Never	11	4.0	4.0	98.9
Not sure	3	1.1	1.1	100.0
Total	275	100.0	100.0	

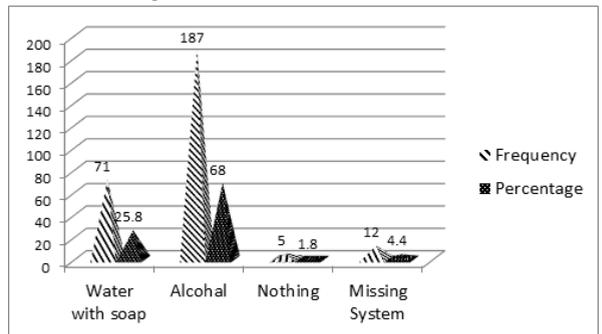
Reason for not using personal protective equipment(PPE): due to lack of materials 71(26%), 39(14.2%) due to lack of awareness, 29 (11%) due to carelessness.

Table: 4 Reason for not using personal protective equipment

	Frequency	Percent	Valid Percent	Cumulative Percent
Lack of materials	71	25.8	51.1	51.1
Lack of awareness	39	14.2	28.1	79.1
Carelessness	29	10.5	20.9	100.0
Total	139	50.5	100.0	
Missing System	136	49.5		
Total	275	100.0		

Things used for cleaning IV site: Alcohol use was 187 (68%), 71(26%) uses water with soap.

Figure No.9 shows the frequency and percentage of the things used for cleaning IV site



Chance of needle stick injury: 174 (63.3% faced needle stick injury whereas 101(37%) had not face needle stick injury

Table: 5 Chance of needle stick injury

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	174	63.3	63.3	63.3
No	101	36.7	36.7	100.0
Total	275	100.0	100.0	

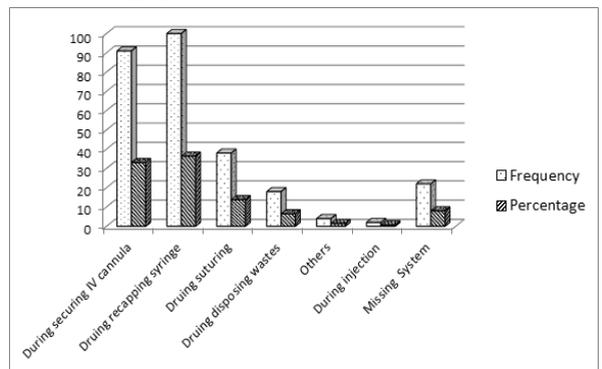
Frequency of needle stick injury: 103(37.5%) had one time injury, 61 (22%) had two times whereas 56(20.4%) had more than 3 times injury

Table: 6 Frequency of needle stick injury if yes, how many times needle

	Frequency	Percent	Valid Percent	Cumulative Percent
One times	103	37.5	46.8	46.8
Two times	61	22.2	27.7	74.5
More than 3 times	56	20.4	25.5	100.0
Total	220	80.0	100.0	
Missing System	55	20.0		
Total	275	100.0		

Occasion of needle stick injury: 100(36.4%) during recapping syringe, 91(33.1%) during securing IV cannulation, whereas 38(14%) during suturing

Figure No.10 shows the frequency and percentage of occasion of needle stick injury



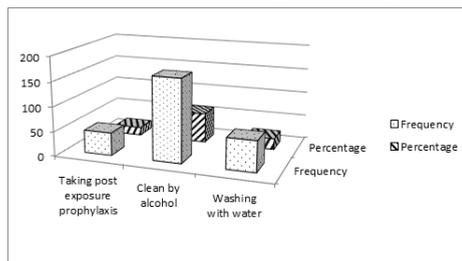
Exposed to body fluid: 150(55%) exposed to body fluid whereas 125(46%) not exposed

Table: 7 Exposed to body fluid

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	150	54.5	54.5	54.5
No	125	45.5	45.5	100.0
Total	275	100.0	100.0	

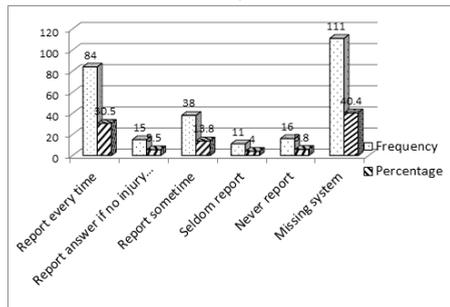
Measures if exposed to body fluid: 167(61%) clean by alcohol, 62(22%) washing with water whereas 46(17%) took post prophylaxis

Figure No.11 shows the measures if exposed to body fluid



Occasion of report (if exposed with body fluid): 84(30.5%) report every time, 38(14%) report sometimes, 16(5.8%) never report

Figure No.12 shows the frequency and percentage of exposure of impaired skin or mucosa with body fluid



Prophylaxis vaccination: 211 (77%) got vaccinated. 64(23%) not vaccinated.

Table 8: prophylaxis vaccination

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	211	76.7	76.7	76.7
No	64	23.3	23.3	100.0
Total	275	100.0	100.0	

DISCUSSION:

The Universal precautions, proposed by the United States Centers for Disease Control and Prevention (CDC) in 1996, are guidelines for reducing the risk of transmission of blood-borne and other pathogens in hospitals.

Healthcare workers (HCWs) are at direct risk of exposure to blood and other body fluids during the course of their job. Consequently, they are at risk of infection of blood borne viruses including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).¹ Occupational exposure to blood can result from percutaneous (needle stick or other sharps injury) and mucocutaneous injury (splash of blood or other body fluids into the eyes, nose, or mouth), or blood contact with non-intact skin.² Needle stick injury (NSI) is the most common form of occupational exposure to blood which results in transmission of blood borne infection. Healthcare-associated infections (HAIs) have been reported to be a serious problem in the healthcare services as they are common causes of illness and mortality among hospitalized patients including HCWs.^{3,4,5,6,7}

Compliance with these standard precautions has been shown to reduce the risk of exposure to blood and body fluids.⁸ The term “standard precautions” is replacing “universal precautions”, as it expands the coverage of universal precautions by recognizing that any body fluid may contain contagious and harmful microorganisms.⁹

Importance to assess the level of compliance with universal precautions by the various types of HCWs who make direct contact with patients, and level of compliance by HCWs in the various types of health facilities. Precautions to be used for the care of all patients in hospitals regardless of their presumed infection status.¹¹ Blood, certain other body fluids, and tissues of all patients should be considered potentially infectious.^{10,12}

In 1987 the Centers for Disease Control and Prevention (CDC) developed standard precautions to help protect both HCWs and patients from infection with blood-borne pathogens in the healthcare

setting,¹⁰ that blood is the most important source of HIV, HBV, and other blood-borne pathogens and the infection control efforts should focus on the prevention of exposures to blood as well as the receipt of HBV immunizations

Our study showed that out of 275 resident doctors, 94% participants practiced hand washing if contacted with different patients, 91% practiced hand washing after taking of gloves whereas 94% practice hand washing after contacted with blood and body fluid. 93% agreed to wear gloves while drawing of body fluid whereas 91 % participants agreed to changes gloves if contacted with different patients. 63% used gloves always, 35% used gloves sometimes and 3% never used gloves. 52% participants used personal protective equipment 55% participants exposed to body fluid. 63 % participants faced needle stick injury, among whom 38% had one time injury, 22% had two times whereas 21 % had more than 3 times injury. 37% faced needle stick during recapping syringe, 33% during securing IV cannulation, whereas 14% during suturing. 77% took prophylaxis vaccination whereas 23% have not vaccinated.

Data showing similar type of studies done around world.

Similar study done in *South India* showed the use of hand rub (95%) and gloves (77%), reported use of protective eye gear and outer protective clothing was very low (22 and 28%, respectively). Despite a perceived risk of exposure to blood-borne infections, 8% of the HCWs had not completed the hepatitis B vaccination schedule. About 17% reported at least one needle stick injury in the past year but only 5.6% received medical attention²⁶

Another study done in *Nigeria* showed that only 70.1% usually wear gloves before handling patients. But 2.6% reported hand washing before wearing the gloves, 10.7% wash hands after removal of gloves, and 72.4% change gloves after each patient. About 20.2% usually wear face mask and 35.6% wear protective garments when necessary.

Furthermore, 14.3% reported that they do not sterilize instruments before use and 39.7% could not disinfect working surfaces when necessary. Only 3.3% of respondents reported reuse of needles and blades and 5.7% reuse disposable items regularly. Only 3.3% had a sharp disposal system in their various workplaces. Majority 98.6% of the respondents reported that the major reason for noncompliance to universal precautions is the non-availability of the equipments. However, 39.7% reported that they do not have a functioning autoclave.

Infections are associated with increased risks of mortality and morbidity. It is estimated that Infections are responsible for 1.5 per cent of all deaths and 3.5 per cent of the total disability adjusted life years (DALYs).¹¹

Standard precautions apply to blood; all body fluids, secretions, and excretions (except sweat); non-intact skin; and mucous membranes.¹¹ The core elements of standard precautions comprise (i) hand washing after patient contact, (ii) the use of barrier precautions (e.g., gloves, gowns, and facial protection) to prevent mucocutaneous contact, and minimal manual manipulation of sharp instruments and devices and disposal of these items in puncture-resistant containers.^{10,11,12}

The importance of airborne transmission of microorganisms in the hospital setting and the risk of cross infection between patients and Health care providers especially in respect of blood-borne pathogens are widely documented.¹³ Hospital-based personnel and personnel who provide healthcare outside hospital may acquire infections from or transmit infections to patients, other personnel, household members, or other community contacts.¹⁴

Standard precautions are the minimum infection prevention practices that apply to all patient care, irrespective of suspected or confirmed infection status of the patient, in any health care setting. These practices aim to both protect health care providers and prevent them from transmitting the infections to their patients.^{1-5-17.}

Health care providers face the occupational risk of exposure to infection with blood-borne pathogen during the course of their routine work in the wards, intensive care units, emergency/trauma triage, and so forth. Worldwide, almost three million Health care providers experience percutaneous exposure to blood-borne pathogens each year¹⁸ Despite infection control precautions and availability of hepatitis B

vaccine, health care providers remain at risk of acquiring blood-borne infections¹⁹. Many exposures can be prevented by careful adherence to existing infection control precautions, immunization against hepatitis B, and provision of personal protective equipment during the management of patients.²⁰⁻²²

Despite the availability of detailed guidelines, the knowledge and compliance with standard precautions vary among Health care providers and have been found to be inadequate in both developed and developing countries²³⁻²⁵.

Conclusion

Health care giver are at highest risk of various nosocomial infections that can be prevented through proper execution of norms of universal precaution and help to control the occurrence of hospital acquired infections. Careful adherence to components of universal precautions can protect both health personal and patients from various infections. This study has identified the perceptions and compliance with the use of standard precautions and assessed the determinants of noncompliance among the resident doctors in tertiary hospital like ours.

The study creates public awareness about the application of norms of standard precaution. It provides health education to medical professional to protect themselves and patients from various infections. It has beneficial to the health professional to improve their knowledge, attitude and practice regarding execution of knowledge of standard precaution. The study helps in formulation of strategies for infection prevention and control.

Recommendation:

Health persons must relies the importance of good hygiene, hand washing technique and proper use of gloves. It is mandatory to treat all blood and other potentially infectious materials with appropriate components of standard precautions.

This study recommends Standard Precautions for the care of all patients, regardless of their diagnosis or presumed infection status.

Knowledge and awareness among health personal regarding execution of components of universal precautions should be increased so that the risk of transmission of microorganisms from both recognized and unrecognized sources of nosocomial infection can be minimized.

Limitation:

In developing countries, like ours, the scale of the problem is not well understood. There is little public awareness of the problem and legislation.

The execution of Universal precaution was found often inadequate and difficult. The enforcements were needed implicate the norms of universal precaution. Attitude of the treating doctor towards universal precaution was challenging. Availability of personal protective equipment was found inadequate and unavailable. Time constraint was another limitation of junior resident.

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Conflict of interest

We declare no conflict of interest.

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