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Review Article

Compliance of universal precautions: ensures safety to health care providers

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ABSTRACT

Healthcare workers (HCWs) such as medical doctors, nurses, laboratory staff and aides who work in the hospitals, clinics and other health care settings are frequently exposed to infectious diseases. Some of these infectious diseases have no available vaccination; consequently, these blood borne infections are a major cause of risk for health care worker. The knowledge and awareness of universal precautions is thus essential for all HCWs and other people in at risk occupations. A review of the literature on universal precaution's using Google search engine was done. Twenty one scientific publications on universal precautions and standard precautions were reviewed and summarized. Health care professionals needed to be updated on the principles of universal basic precautions as it had been proven that there were deficiencies in the knowledge and applications of the practice of the universal precautions. To minimise the risks of acquiring HIV, HBV and other blood borne diseases during performance of job duties, workers should be protected from exposure to blood and other body fluids. In order to protect hospital workers, the hospital authorities must provide general information about the danger to be faced in practises, the ways in which AIDS and hepatitis were transmitted and must give general training with mass awareness to the hospital staff. It can be concluded that hospital staff and authorities other are equally responsible and accountable for transmission of these hospital-acquired information.

Keywords: Compliance, Universal precautions, Patients safety, Health care providers and occupational risks

INTRODUCTION

HCWs are potentially exposed to blood and body fluids (BBF) in the course of their work and therefore are at risk of infection with blood-borne pathogens.[1] Worldwide, three million HCWs experience percutaneous exposure to blood-borne viruses each year (two million hepatitis B HBV, 900,000 hepatitis C HCV and 300,000 human immunodeficiency virus HIV). Exposure to BBF can occur through a percutaneous injury (needle-stick injury, NSI) or mucocutaneous incident (BBF splash).[2] Awareness regarding this occupational risk led to the issue of guidelines by CDC as universal precautions (UPs) in 1987, later updated in 1996.

BBFs may contain blood-borne viruses (e.g. hepatitis B and HIV) or other bacterial and other viral pathogens. These can present a risk to other patients and HCWs. As it is not always possible to know who is infected with these pathogens, emphasis on infection control effort should focus primarily on universal infection control precautions (UICP) which prevent the exposure to BBFs which are presumed to be potentially infective. These precautions apply to patients with HIV, HBV, HCV non-A non-B, syphilis, malaria, blood-borne viral and bacterial infections.[3] Application for UPs means that all patients body fluids should be treated as infectious, since it is not known who is infected and carry a virus. The

purpose of these precautions is to prevent the exposure and infection of HCWs from blood-borne pathogens.

The hospital is not just only a place where sick people recover from their illness, but also where the healthy get infected. Workplace exposure and hazards could cause devastating effects on health and quality of life. There are many different types of accidental injuries in the health industry but needle stick injury remains the commonest of all. Occupational exposure to the body fluid can result from percutaneous injury or sharps injury, mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth or body contact with non-intact HCWs are at risk of exposure to diseases like HBV, HCV, HIV and other blood borne disease as they are in direct contact with patients and frequently handle sharps in the course of their work. NSI is the non-intentional puncture of the skin caused by an injection needle while sharp injuries are caused by puncture of the skin by a sharp object or instrument. HCWs especially the nursing staffs are prone to NSIs. HCWs such as medical doctors, nurses, laboratory staff and aides who work in the hospitals, clinics and other healthcare settings are frequently exposed to infectious diseases. Some of these infectious diseases have no available vaccination. Consequently, these blood borne infections are a major cause of risk for HCW.

Using the better safe than sorry principle UPs are based on the assumption that blood and certain body fluids of all people carry HIV, HBV and other blood borne pathogens.

By 1987 CDC recommended that to prevent transmission of HIV, precautions for handling BBFs apply to all patients regardless of diagnosis. This system has been called UPs.

Awareness regarding the occupational risk led to the issue of guidelines by CDC as UPs in 1987, later updated in 1996.[2] Despite detailed guidelines, the knowledge and understanding of UPs among HCWs even in developed countries has been found to be inadequate. In developing countries, including India, the situation is worse and occupational safety of HCWs remains a neglected issue.

Magnitude of occupational health hazards among HCWs

Some categories of HCWs are at greater risk than others because of the nature of their work in contacting disease at work. Nurses and house surgeons are prone to accidental exposure to blood borne pathogens and body fluids because of multitude of reasons such as nature of their work, which invest extensive contact with the sick patients, specimen handling. A number of studies from developing countries have examined the knowledge, attitude and compliance of doctors and nurses towards standard precautions.[4,5] Numerous studies have found nurses to be the commonest group of HCWs experiencing NSIs, as NSIs are reported as the most common occupational health hazards. Various studies carried out among different categories of HCWs found that exposure to BBFs was approximately 9.3%.[6]

A study in department of community medicine and behavioural sciences, faculty of medicine, health sciences center, Kuwait university, Al-Jabriya, Kuwait showed a high prevalence of poor knowledge and poor practice of UPs among medical students in the faculty of medicine, Kuwait university and raised the need to address these issues during the clinical years. In a study on the knowledge and compliance of UPs amongst doctors in private medical practice in Lagos State, Nigeria by Kalu and Odusanya, 81.2% had knowledge that UPs should be observed in all 17 patients while NSIs to the surgeons had been shown to occur every 20-40 operations.[7]

NSIs are frequent occurrences in healthcare settings and can lead to serious complications. While the introduction of UPs and safety conscious needle designs has led to a decrease in NSIs, they still do occur. NSIs are an occupational hazard for millions of HCWs. Even though universal guidelines have decreased the risks of NSis over the past 30 years, these injuries continue to occur, albeit at a much lower rate. Healthcare professionals at the highest risk for NSIs are surgeons, emergency room workers, laboratory room professionals and nurses. In the past, the majority of NSIs occurred during resheathing of the needle after withdrawal of blood from a patient.

UPs are the general guidelines developed by CDC Atlanta centre for the disease control USA and recommended by WHO Geneva to minimise the risk of infection from blood borne pathogens including HBV and HIV infections in HCWs. Although all HCWs are exposed to get these diseases but workers engaged in following areas are potentially at high risks. They are blood transfusion unit, intensive care unit, dialysis unit, medical laboratories, operation theatre, microbiology, dissection room, ward for infected patients, sterilization and disinfection room.[8,9]

Importance of UPs

There are two reasons that healthcare professionals use universal precautions. The first reason is to protect patients. Washing hands, changing gloves, wearing masks, all reduce the risk of passing a disease from patient to patient or doctor to patient. The second reason is to protect themselves. Protective gear reduces the exposure of professionals to blood-borne illnesses and other infectious diseases. UPs make the healthcare workplace much safer. The potential for blood contact with non-intact skin puts the operating room personnel at an increased risk of exposure to hepatitis or HIV. UPs were issued to reduce the transmission of HIV in health care settings, they were also appropriate for the reducing the transmission of other blood borne infections.

The most common route of exposure are sharps, lancets, broken glass, needles and other sharp instruments or devices during procedures or when cleaning used instruments. These events also occured during disposal of used needles and handling of sharp instruments after procedures and other invasive procedures such as setting intravenous lines, lumber puncture and catheterization. Research had indicated that sharp injury may be under reported by 39.4% to 75%. Some HCWs were not seriously concerned about infection by sharp injury and forgot to report accidents. Many cases of NSIs go unreported and use of UPs is poor.

The period of gloving and removal of gloves was also another significant risk period for the contact with BBFs. Human exposure which is defined as contact with BBFs in which UPs apply, through percutaneous inoculation or contact with an open wound, non-intact skin or mucous membrane during the performance of normal job duties, has been shown to be quite common. The risk of such exposure also occurred daily among HCWs with simple processes like recapping, disassembly and inappropriate disposal of needles which increased the risk of NSIs. The knowledge and practice of UPs is thus important in preventing disease related to this exposure. Transmission of HIV in healthcare settings can occur from patient to HCW, between patients or from HCW to patients.[8,9]

The risk to staff arises from sharps and hollow needles, splashing of conjunctivae and mucous membranes with contaminated BBFs, heavy contamination of broken skin, (e.g. cuts, dermatitis), handling of large quantities of BBFs without protective clothing. The risk to patients arises from use of recycled hollow needles and syringes, contaminated blood transfusion, heavy soiling of the environment, poor ward facilities and cleaning.

What are UPs?

UPs as defined by Centre for Disease Control are a set of precautions designed to prevent transmission of HIV, HBV and other blood borne pathogens while providing healthcare in any healthcare setup. Under UPs, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other blood borne pathogens. The recommendations of UPs include wearing gloves, gowns and aprons when collecting or handling BBFs contaminated with blood, wearing face shields when there is danger of blood splashing on mucous membranes. Others include disposing of all needles and sharp objects in puncture-resistant containers. These recommendations are for doctors, nurses, patients and healthcare support workers who are required to come into contact with patients or body fluids. Lastly, it is also recommended that all HCWs take precautions to prevent injuries caused by needles, scalpels and other sharp instruments or devices.[10]

Practising UPs

Four standard practices are recommended. These include hand washing, use of protective barriers to prevent direct contacts, safe handling and disposal of sharps and safe decontamination of instruments and other contaminated equipment.[11-13]

Protection clothing

Gloves: Gloves should be worn for direct contact with blood or body fluids and for direct contact with non-intact skin or mucous membranes. Gloves should be made of latex and should fit well. Disposable gloves are recommended unless heat disinfection is available. Alcohol disinfection between patients is not recommended because the viruses can become fixed to the latex by the alcohol. Gloves should be discarded after each procedure.[14]

Plastic aprons and protective clothing: Aprons are recommended when there is a risk of contamination by BBFs and tissue when particular high risk procedures are performed. There are basically two systems being practised. A two-tier system (protective clothing are used only for known high-risk patients such as HIV and hepatitis B positive patients) are sometimes practiced in areas with a low incidence of blood-borne diseases. However single tier system (where universal precautions are applied to all patients) should be practised when the incidence is high. These should be worn to protect staff from body fluids. Again, disposable aprons are preferable to recycled ones.

Eye protection: Goggles or some sort of eye protection (visor) should be worn to (avoid conjunctival splash contamination. Spectacles are acceptable.

Masks: These are recommended to avoid BBFs splashing into the mouth and nostrils.

Broken skin: Cuts and abrasions on the hands and forearms should be covered with a waterproof dressing.

Handwashing: Hands should be washed thoroughly and immediately with soap and water after contact with body fluids. Hands should be thoroughly washed even if gloves are worn. Handwashing is the single most important procedure for the prevention of hospital-acquired infections. There are two types of hand washing. Social hand washing should be carried out routinely before and after coming into contact with patients. Aseptic handwashing should be used when as aseptic procedure is about to be performed on a patient (e.g. introducing central venous pressure lines, peripheral cannulae or urinary catheters). This requires meticulous cleaning of the hands and the use of a sustained action disinfectant. It is usually accompanied by the wearing of gloves. Soap and water soap and water remove most organic contamination and are acceptable as a social-hand wash.

Soap and water should be supplemented with an alcohol containing sustained action disinfectant prior to carrying out an aseptic technique.

Prevent injury: Precaution to be taken to prevent injury caused by needle, scalpel and other sharps. Never try to recap or reinsert the hypodermic disposable needle in its bag and cap/sheet. It is the commonest mode of NSI in the HCWs. All used disposable needle, syringe must be discarded in puncture resistant container after use preferably wide mouth plastic container with a cap.[14,15]

Adequate resuscitation devices: All the resuscitation devices used in these types of patients should be made available in plenty and discarded after use (e.g. plastic disposable airway, endotracheal tube and ventilation device).

Sterilization: Sterilize all reusable device end surfaces such as OT instruments, linen, hand paces, mortuary equipment, instruments used in pathological laboratory with appropriate germinal and sterilizer preferably autoclave.

Hospital waste management: Biohazard waste generated in the hospital to be aggravated at the point of generation. Safe methods for handling, collection and transportation to be followed by staff as prescribed by rules from by ministry of environment and forest and central pollution control board.

Caution to pregnant women: If HCW developed HIV during pregnancy, the infant is at risk of infection resulting to prenatal transmission. As for as possible pregnant women should avoid handling AIDS patients.

Notification of health care worker who are exposed accidentally: Exposed area must be washed with soap and water. BBF must be removed and clean under running tap water with soap. Notify the accident.

Ensure the implementation of UP

Healthcare professionals need to be updated on the principles of universal basic precautions as it has been proven that there are deficiencies in the knowledge and applications of the practice of the universal precautions. To minimise the risks of acquiring HIV, HBV and other blood borne diseases during performance of job duties, workers should be protected from exposure to BBFs. Protection can be achieved through adherence to work practices designed to minimise or eliminate exposure and using personal protective equipment (PPE) that is gloves, masks and protective clothing which provide a barrier between the worker and the exposure source. There is a need for strict compliance to adopting safety engineered devices which will help in the reduction of NSI and sharp injury and risk of blood borne infections.[15,16]

There is an urgent need to reduce the incidence of these work related accidents injuries through training programmes and seminars for health workers. This will help to reduce their chances of acquired occupational disease. There is also a need to institute effective reporting system in hospitals through staff clinics. Lack of reporting makes it difficult to certain the true incidence and prevalence of such injuries and difficult to put appropriate control measures into place. A number of studies that have been conducted on the reporting of the NSIs have revealed that there are a high proportion of NSIs that occurred among HCWs which were not reported to the occupational health services. A number of factors have been identified as stumbling blocks that prevented HCWs from reporting NSIs. These included misperception of the risk of getting an infectious disease, unawareness of the reporting procedures, time constraints, absence of a policy on reporting, lack of post exposure prophylaxis programme, dissatisfaction with follow up procedures offered and the long wait for professional services and concern about confidentiality and professional discrimination.[17]

Even though most NSIs did not lead to transmission of infection, sometimes one can develop a serious lifelong chronic infection like HIV or hepatitis C. The onus was on the HCWs to prevent NSIs in the first place. Experts suggested that no one safety policy can work all the time and thus, one should have an all-inclusive policy that recognized the behaviour of the HCWs, institutional policies and safe use of sharps and other devices. A critical part of any preventive program was to reduce the use of needles whenever possible and utilize other options when available. Hospital workers may also undergo continuous education and training on the newer devices used during dialysis and blood withdrawal. A monitoring program was essential as it can help eliminate potential risk factors that are responsible for NSIs to ensure that the system was working.[18]

Safety polices

Protect health workers from physical and biological hazards

Ensure the implementation of minimum patient safety, infection prevention, control and occupational safety standards in all healthcare facilities across the health system. Ensure availability of PPE at all times, as relevant to the roles and tasks performed, in adequate quantity and appropriate fit and of acceptable quality. Ensure an adequate, locally held, buffer stock of PPE. Ensure adequate training on the appropriate use of PPE and safety precautions. Ensure adequate environmental services such as water, sanitation and hygiene, disinfection and adequate ventilation at all healthcare facilities. Ensure vaccination of all health workers at risk against all vaccine-preventable infections including hepatitis B and seasonal influenza, in accordance with the national immunization policy and in the context of

emergency response, priority access for health workers to newly licensed and available vaccines. Provide adequate resources to prevent health workers from injuries and harmful exposure to chemicals and radiations, provide functioning and ergonomically designed equipment and work stations to minimize musculoskeletal injuries and falls.

Establish synergies between health worker safety and patient safety policies and strategies

Develop linkages between occupational health and safety, patient safety, quality improvement and infection prevention and control programmes. Include health and safety skills in personal and patient safety into education and training programmes for health workers at all levels. Incorporate requirements for health worker and patient safety in health care licensing and accreditation standards.[19] Integrate staff safety and patient safety incident reporting and learning systems. Develop integrated metrics of patient safety, health worker safety and quality of care indicators and integrate with health information system.

Develop and implement National programmes for occupational health and safety of health workers

Develop and implement national programmes for occupational health for health workers in line with national occupational health and safety policies. Review and upgrade, where necessary, national regulations and laws for occupational health and safety to ensure that all health workers have regulatory protection of their health and safety at work. Appoint responsible officers with authority for occupational health and safety for health workers at both the national and facility levels. Develop standards, guidelines and codes of practice on occupational health and safety.[20] Strengthen intersectoral collaboration on health worker and patient safety, with appropriate worker and management representation including gender, diversity and all occupational groups. Both legal and ethical expect are involved by dealing with risk specially hospital acquired infections the life of the employee is associated with such conditions for which he/she may pose the responsibility in hospital in a view of the above it is also imperative to consider the matters which are closely related like responsibility and accountability of the employer towards its employee, Responsibility and accountability of the employee, standard practices to be followed to prevent such hospital hazard/risks, legal and ethical responsibility of the employer to keep secret or disclose such risks, professional risk liability and compensation in case it was proved.[21]

CONCLUSION

In order to protect hospital worker, the hospital authorities must provide general information about the danger to be faced in practises, the ways in which AIDS and hepatitis are transmitted and must give general training with mass awareness to the hospital staff. It can be concluded that hospital staff and authorities other are equally responsible and accountable for transmission of these hospital-acquired information. UPs should be used by all HCWs when caring for all patients and when handling body fluids. All HCWs should routinely use the appropriate barrier precautions to prevent skin and mucous membrane exposure during contact with any patient's BBFs that require UP.

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