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## ABSTRACT

**Background:** Health care staffs are at risk of acquiring infections from patients at the workplace. The knowledge and awareness of universal precautions is thus essential for all healthcare workers and other people in at risk occupations.

**Methodology:** A review of the literature on universal precaution's using Medline and Google search engine was done. Thirty six scientific publications on universal precautions and standard precautions were reviewed and summarized.

**Conclusion:** Universal precautions should be used whenever there may be occupational exposure to blood or other potentially infectious material to prevent contact with patients' blood or other potentially infectious maternal.

**KEY Words:** Universal and Standard

## INTRODUCTION

The hospital is not just only a place where sick people recover from their illness, but also where the healthy get infected<sup>1</sup>. Workplace exposure and hazards could cause devastating effects on health and quality of life<sup>2</sup>. There are many different types of accidental injuries in the health industry but needle stick injury remains the commonest of all<sup>2,3</sup>. 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

skin<sup>1,2,4</sup> which can all cause substantial health consequences and psychological stress for health care workers and their loved ones<sup>5</sup>.

Health care workers 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 or cure; consequently these blood borne infections are a major cause of anxiety for health care workers<sup>6</sup>. Health care workers are at risk of exposure to diseases like hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and other blood borne disease as they are in direct contact with patients and frequently handle sharps in the course of their work<sup>1,4,7,8,9,10</sup>.

Globally about three million, health care workers experience percutaneous exposure to blood borne pathogens each year with 2 million of these exposed to HBV, 0.9 million to HCV and 170,000 to HIV. These injuries may result in 15,000 HCV, 70,000 HBV and 1000 HIV cases with more than 90% of these infections occurring in developing countries<sup>2,6,8</sup>.

The fact that blood and other fluids from patients are becoming increasingly hazardous to those who provide care for them has become of great concern to health professionals the world over<sup>11</sup>, as workers in developing countries account for the highest rate of needle stick injuries<sup>2,4</sup>.

Needle stick injury 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<sup>12</sup>. Health care workers especially the nursing staffs are prone to needle stick injuries<sup>13</sup>.

which may result in blood borne infections with serious consequences, including long term illness, disability and even death<sup>12</sup>.

With the discovery of HIV and (acquired immunodeficiency syndrome) AIDS, the medical community began to recognise widely the dangers of serious illnesses spreading through contact with contaminated blood and body fluids<sup>14</sup>. It is now recognised that more infection control precautions are needed as all body fluids are potentially infectious<sup>15,16</sup>.

It is on this background that the knowledge and awareness of universal precautions is thus essential for all healthcare workers and people in other at risk occupations.

### What are Universal precautions?

Universal precautions is defined by the centre for disease control (CDC) as a set of precautions or actions designed to prevent the transmission of HIV, HBV, HCV and other body fluid, blood borne pathogens when providing first aid or health care<sup>15,17,18</sup>. In 1996, universal and body substance isolation were replaced by the latest approach known as standard precaution<sup>19</sup>.

Body fluid to be treated with universal precautions are blood, cerebrospinal fluid, peritoneal fluid, pleural fluid, pericardial fluid, synovial fluid, amniotic fluid, urine, semen, vaginal secretions, saliva any other fluids from tissues, organs, non-intact skin and mucous membrane<sup>17</sup>. The aim of universal precautions is to protect both the health worker from being infected and the uninfected patient from getting infected by the health worker<sup>8,20,21</sup>. Under universal precaution principles, blood and certain body fluids of all patients are considered potentially infectious of blood borne pathogens for HIV, HBV and other blood borne pathogens<sup>2,11,22</sup>. Unfortunately the knowledge and understanding of universal precautions among health care workers in general is poor<sup>2</sup>. The proper clinical application of universal precautions are therefore important for every health care professional that provides dental, medical and other patient care<sup>11</sup>.

### Incidence And Prevalence Of Occupational Health Hazards Among Health Care Workers

Certain groups of health care workers are at greater risk than others because of the nature of their work in contacting disease at work. A number of studies from developing countries have examined the knowledge, attitude and compliance of doctors and nurses towards standard precautions<sup>23,24</sup>. Numerous studies have found nurses to be the commonest group of health care workers experiencing needle stick injuries<sup>5</sup>, as needle stick injuries are reported as the most common occupational health hazards<sup>23,25</sup>. Various studies in health institutions in Nigeria have reported poor knowledge of universal precautions among health workers<sup>18</sup>; this is in line with the World Health Organization estimates that about 2.5% of HIV cases and 40% of HBV and HCV cases among health care workers worldwide are the result of exposure at work<sup>26</sup>.

Various studies carried out among different categories of health care workers found that exposure to blood or other body fluid was approximately 9.3%<sup>4</sup>.

In a study on the knowledge and compliance of universal precautions amongst doctors in private medical practice in Lagos State, Nigeria by Kalu and Odusanya, 81.2% had knowledge that universal precautions should be observed in all patients<sup>17</sup> while needle stick injury to the surgeons has been shown to occur every 20-40 operations<sup>9</sup>.

Medical practitioners handling a lot of emergencies especially those in surgical specialties are more predisposed to exposure to contaminated blood<sup>20</sup>. In a study of needle stick injuries among interns at a Nigerian teaching hospital in Enugu, Nigeria by Okeke in 2009, 81.7% had experienced one episode of needle stick injury<sup>25</sup>. A study by Okafor et al on needle stick injuries among medical practitioners at Nnewi, south eastern Nigeria reported a rate of 64.4%<sup>20</sup>. In a study done among a random sample of residents, interns, nurses and technicians, it was observed that needle stick injury was the most common mode of occupational exposure with the index finger and

thumb as the commonest sites of exposure<sup>27</sup>. A study, in south eastern Nigerian among doctors, nurses, laboratory staff and cleaners in three tertiary health institutions to assess the use of protective equipment and materials reported that where available, these equipment's were found to be inconsistently used<sup>28</sup>. A study which targeted final year medical and nursing students of ObafemiAwolowo University Teaching Hospital complex in Nigeria showed a higher level of knowledge among nursing students than medical students in terms of awareness of basic principles of universal precautions<sup>11</sup> consequently the prevalence of needle stick injuries among medical interns generally is very high<sup>25</sup>. This may be due to the fact that these fresh graduates who are having their first encounter with clinically procedures have no prior orientation and training on universal precautions. In addition many cases of needle sticks injuries have been found to go unreported. The review of the literature does establish a significant risk of blood borne infectious disease among medical and healthcare personnel in Nigeria in addition to a poor application and practice of universal precautions which is in contrast with the reported good awareness.

### **Importance Of Universal Precautions**

The potential for blood contact with non-intact skin puts the operating room personnel at an increased risk of exposure to hepatitis or HIV<sup>29</sup>. Universal precautions were issued to reduce the transmission of HIV in health care settings, they are also appropriate for the reducing the transmission of other blood borne infections<sup>30</sup>. The most common route of exposure aresharps, lancets, broken glass, needles and other sharp instruments or devices during procedures or when cleaning used instruments. These events also occur 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. The period of gloving and removal of gloves is also another significant risk period for the contact with blood and body fluids<sup>1,11,31</sup>.

Human exposure which is defined as contact

with blood or other body fluids in which universal precautions apply, through percutaneous inoculation or contact with an open wound, non-intact skin or mucous membrane during the performance of normal job duties<sup>32</sup>, has been shown to be quite common. The risk of such exposure also occurs daily among health workers with simple processes like recapping, disassembly and inappropriate disposal of needles which increases the risk of needle stick injury<sup>4</sup>. The knowledge and practice of universal precautions is thus important in preventing disease related to this exposure.

### **Practising Universal Precautions**

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<sup>20</sup>. Where injuries and blood splashes occur reporting centres should be made available. Research has indicated that sharp injury may be under reported by 39.4% to 75%<sup>6</sup>. Some health care workers are not seriously concerned about infection by sharp injury and forget to report accidents<sup>6</sup>. Many cases of needle stick injuries go unreported and use of universal precautions is poor<sup>25</sup>.

### **Hand Washing**

The hand is the most common vehicle for microbial transmission<sup>1</sup>. Hand washing has been proven as an essential and the single most effective method used in preventing the spread of infections and infectious agents<sup>1,17</sup>. Hand washing reduces the number of potentially infectious micro-organisms in the hand and decrease the incidence of infection transmission in the health care facility<sup>1</sup>. Hygienic hand washing involves the use of antiseptic and / or detergents to wash the hand for as little as about 10-15 seconds or to use an alcohol based agents to disinfect the hands<sup>1</sup>.

The hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood and other body fluids to which universal precautions apply or potentially

contaminated articles<sup>11,32</sup>. Hands should be washed after gloves are removed even if the gloves appear to be intact. Hand washing should be done using the appropriate facilities such as utility or restroom sinks<sup>32</sup>. Hands should always be washed with soap and running water following contact with blood or other potentially infectious body secretions even if gloves have been used for the task<sup>21</sup>. In resource poor centres where water scarcity may be predominant, the hands should be washed while an assistant pours water. Disposal napkins and towels should be provided as using the same towel by more than one person transmits germs among individuals. In affluent health facilities, automated and electric hand dryers are available which is ideal. Health personnel should be encouraged to carry about hand sanitizers although this does not replace hand washing. Hand washing is the most effective way to reduce the spread of disease<sup>21</sup>.

### **Use Of Protective Barriers**

Protective barriers reduce the risk of exposure of the health care workers skin or mucous membranes to potentially infectious materials and the risk of exposure to blood and other body fluids to which universal precautions apply by preventing contact with potentially pathogenic microorganisms by creating a physical barrier between the potentially infectious materials and the health care workers<sup>1,4,17</sup>. Generally surgeons have been shown to report infrequent use of protective strategies<sup>33</sup> which increases the risk of exposure. Health care workers must endeavour to wear personal protective equipment to guard against blood borne pathogens if there is a reasonable anticipated exposure to blood and other potentially infectious materials. If splashing is anticipated, protective eye wear should be worn along with an impervious gown or apron which provides an effective barrier to splashes<sup>32</sup>. Plastic bags should be available for removal of contaminated items from the site of the spill, shoes and boots can become contaminated with blood in certain instances<sup>32</sup>. The personal protective devices include gloves, apron, masks, goggles and boots<sup>17</sup>.

### **Gloves**

Since medical history and examination cannot

reliably identify all patients harbouring blood borne pathogens, universal precautions during exposure to blood and body fluids are mandatory. Gloves which should be worn for direct contact with blood or body fluids and for direct contact with non-intact skin or mucous membrane, should fit well and be made of latex<sup>21,30</sup>. Gloves can be disposal or non-disposable depending on what procedure is to be carried out. A number of means including accidental damage with needles can breach and puncture gloves<sup>30</sup>. Gloves must be worn as single use item to prevent contamination of health care workers hand if anticipating direct contact with blood or body fluids, mucous membranes and non-intact skin. Protective gloves should be worn to remove contaminated shoe coverings<sup>21,32</sup>. Gloves must be discarded following each procedure in plastic bags and the hands washed<sup>21,32</sup>. Gloves reduce the incidence of blood contamination of hands during phlebotomy but they cannot prevent penetrating injuries caused by needles or other sharp instruments<sup>21</sup>. In 1987, the American dental association recommended that all dentists wear gloves during examination and intraoral surgical procedures. In the dynamic environment in which they are used, gloves function as a bidirectional barrier only when they remain intact.

Through the years, researchers have shown that latex gloves serves as an effective barrier to most pathogens. Whether or not gloves are sterile should have no influence on their ability to prevent transmission of blood borne diseases from patients to the health care workers and vice visa. This determined solely by the integrity of the gloves<sup>34</sup>.

### **Goggles**

Protective eyewear should be worn when there is risk of splash or spilling of blood or body fluids. Doctors who used eye protection regularly had less blood contacts via conjunctiva than surgeons who seldom or never used such protection<sup>33</sup>.

### **Aprons**

Plastic aprons should be worn during delivery, surgical procedures and cleaning if splashing is



anticipated.

### **Masks**

Masks are recommended to avoid blood or body fluid splashing into the mouth and nostrils. Cuts and abrasions on the hands and forearms should be covered with waterproof dressing.

### **Adherence To Universal Precaution**

Safety standards which guide the occupation are either lacking or not adhered to in many developing countries including Nigeria<sup>35</sup>. Universal blood and body fluid precautions encompasses a wide range of steps taken during regular work day by health care workers and must be adhered to strictly in order to protect self, patient and co-workers from infection. All health care workers should routinely follow these precautions at any time there is the possibility of touching or being splashed with any person's blood or body fluids on their skin or mucous membrane<sup>16</sup>. Thoughtful adherence to universal precautions remains the primary means of reducing the occupational risk of infection with blood borne pathogens<sup>22</sup>. Routine training sessions are necessary in all health facilities to improve the health workers knowledge of the different aspects of universal precautions to order to ensure safe practice and adherence to universal precaution guidelines<sup>22</sup>.

Health care 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<sup>7</sup>. 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<sup>32</sup>. Protection can be achieved through adherence to work practices designed to minimise or eliminate exposure and using personal protective equipment that is gloves, masks and protective clothing which provide a barrier between the worker and the exposure source<sup>32</sup>. There is a need for strict compliance to adopting safety engineered devices which will help in the reduction of needle stick and sharp injury and risk of blood borne infections<sup>5</sup>. 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<sup>3</sup>. Lack of reporting makes it difficult to ascertain 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 needle stick injuries have revealed that there are a high proportion of needle stick injuries that occur among health care workers which are not reported to the occupational health services<sup>13</sup>. A number of factors have been identified as stumbling blocks preventing health care workers from reporting needle stick injuries. These including 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<sup>13</sup>. Occupational hazards reporting systems are unavoidable in many health facilities in developing countries. The knowledge, attitude and compliance among doctors towards standard precaution are inadequate and institutions need to play a greater role to ensure better compliance through the provision of the desired modalities<sup>15</sup>.

A study carried out among health workers in health institutions in Abeokuta, western Nigeria found a high rate of non-compliance of universal precautions<sup>36</sup>. Various factors ranging from personal to organizational are responsible for non-adherence to the basic principles of universal precautions among health care providers. Universal precaution awareness education has not been pronounced among health care providers especially in developing countries<sup>11</sup>. The level of awareness of universal precautions increases with longer years of service in the health care sector<sup>4</sup>. The deficient knowledge base among some health workers may be due to a lack of investment in staff

training or to limited understanding of the health care workers of safe behaviour in the clinical setting<sup>4</sup>. Non-compliance among health care workers could be due to their belief that by adherence to universal precautions makes their procedures difficult especially under clinical pressures. Other reasons for poor compliance with universal precautions include the absence of penalties.

## CONCLUSION

Universal precautions should be used by all health care workers when caring for all patients and when handling body fluids. All health care workers should routinely use the appropriate barrier precautions to prevent skin and mucous membrane exposure during contact with any patient's blood or bodily fluids that require universal precaution. Gloves should be used in situations where the health care worker judges that hand contamination with blood may occur. All sharp should be handled with extreme care.

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