

Knowledge and awareness of health hazards among laboratory personnel

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ABSTRACT

Introduction: The prevention of occupational hazards in laboratories requires a thorough knowledge of the risks and practical measures to be taken. Universal work precautions involve the use of protective barriers such as gloves, gowns, aprons, masks, or protective eyewear, which can reduce the risk of the health care worker's skin or mucous membranes to potentially infective materials. **Materials and Methods:** A cross-sectional study of laboratory personnel was conducted using a pre-tested self-administered questionnaire which enquired about knowledge, attitude, and practices of 40 laboratory personnel toward universal work precautions. **Results:** The knowledge and awareness among laboratory personnel was poor and requires intervention. **Conclusion:** It can be concluded that laboratory personnel are inadequately aware of their occupational hazards and more programs should be conducted to help them understand and fully be aware of the same.

KEY WORDS: Health hazards, HIV, Laboratory, Occupational hazards, Toxins

INTRODUCTION

Occupational hazard is defined as the “potential risk to the health of a person emerging from an unhealthy environment” which is a significant public health issue. It can also be referred to as any activity, materials, processes, or situation that are likely to cause an accident or disease at the workplace.^[1] Although improvement in occupational health has been seen in many developed countries, the protection of workers from work-related disorders is not a priority in many developing countries, partly because several other health issues have competed with occupational health. This situation has existed for long due to various socioeconomic, cultural, and political challenges which often make occupational health not prioritized.^[2] This has made occupational health and safety which is a fundamental right in maintaining workers' well-being to remain neglected in developing countries.^[3,4] Ergonomic-related injuries pose a significant health risk to workers and yet it is the most prevalent occupational injury in health-care

industry.^[5] Health care workers (HCWs) are exposed to blood-borne infections which usually expose them to diseases such as HIV, tuberculosis, and hepatitis B and hepatitis C.^[6]

Pathology laboratory is one of the important sections of a hospital. Any mishandling with samples can result in harmful pathogens entering the bodies of pathologists and other technicians which may be very hazardous. Important hazards requiring assessment and management have been identified as unsafe premises, naked flames, microbial hazards, chemical hazards, glassware hazards, equipment hazards, explosions, infestation by ants, rodents, cockroaches, and unreliable water supply. These may lead to consequences such as accidental ingestion, inoculation and inhalation of pathogens, serious injuries from toxic or harmful chemicals, broken glass causing cuts, bleeding, infection, and also spillage and splashes.^[7]

The prevention of occupational hazards in laboratories requires a thorough knowledge of the risks and practical measures to be taken.^[8] Under universal work precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, hepatitis B virus (HBV), and other blood-borne pathogens.^[9] Universal work precautions involve

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the use of protective barriers such as gloves, gowns, aprons, masks, or protective eyewear, which can reduce the risk of the HCWs skin or mucous membranes to potentially infective materials. In addition, it is recommended that all HCWs take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices. Laboratory technicians are exposed to a large pool of specimens from patients suffering from infections such as HBV and HIV.^[10,11] However, they seem to have a poor perception of the risk of infections and are not compliant with the basic principles of universal work precautions.^[12,13]

The purpose of this study was, therefore, to assess the knowledge of and compliance with universal work precautions among laboratory personnel.

MATERIALS AND METHODS

This cross-sectional study of 40 laboratory personnel was conducted at Saveetha Dental College and Hospitals, Chennai. A structured pretested self-administered questionnaire prepared using guidelines on universal work precautions was used to collect data for the study. Information sought included sociodemographic characteristics such as sex. Attitude and practices of participants were included in the study. The hepatitis B vaccination statuses were also determined.

RESULTS AND DISCUSSION

Forty questionnaires were filled by laboratory personnel and their responses are recorded as a tabular column [Table 1].

It is observed that there are 20% of male laboratory personnel and 80% of female laboratory personnel who have taken up the survey. It is observed that only 10% of laboratory personnel are aware of occupational hazards. Only 17% vaccinated against hepatitis B and 25% wear gloves and face masks while handling chemicals in the laboratory. Only a meager 12% acknowledge that color-coded waste containers are

available to them. Only an alarming 7% acknowledge that they are encouraged to be trained regarding occupational safety matters.

Owie and Apanga^[14] conducted a review titled, occupational health hazards prevailing among HCWs in developing countries which assessed the current status of knowledge regarding blood-borne pathogens. Blood-borne pathogens which include HIV, HBV, and hepatitis C virus (HCV) are the commonly acquired occupational diseases in developing countries.^[15-17] Lee observed that majority of occupational acquired blood-borne diseases by HCWs were as a result of needlestick injuries.^[18] These findings were consistent with studies by Orji *et al.* and Fasunloro and Owotade in Nigeria.^[19,1] In addition, improper disposal of medical waste such as needles and other sharps has been found to cause injuries on HCWs which can also transmit blood-borne diseases.^[20] Lee, in 2009, argued that the increase in acquisition of blood-borne diseases by HCWs in developing countries is due to the high prevalence of HIV, HBV, and HBC, hence, making them more likely to acquire such blood-borne diseases.^[18]

Furthermore, the lack of a comprehensive vaccination coverage among HCWs against HBV, poor use or non-availability of post-exposure prophylaxis, and lack of adherence to standard safety infection control measures such as the use of gloves, washing of hands, and usage of disinfectants increase the risk of transmission of blood-borne diseases.^[18,1]

A study by Akhter *et al.*^[21] titled laboratory work practices and occupational hazards among laboratory HCWs: A health and safety survey reveals that prospective studies of HCWs have estimated that the average risk for HIV transmission after a percutaneous exposure is approximately 0.3%, the risk of HBV transmission is 6–30%, and the risk of HCV transmission is approximately 1.8%. HCWs should adhere to standard precautions, including the appropriate use of hand washing, protective barriers, and care in the use and disposal of needles and other sharp instruments. Employers should have in place a system that includes written protocols for prompt reporting, evaluation, counseling, treatment, and follow-up of occupational exposures that may place a worker at risk of blood-borne pathogen infection. A sustained commitment to the occupational health of all HCWs is required to ensure maximum protection for HCWs.^[22]

A study conducted by Tait *et al.*^[23] titled occupational safety and health status of medical laboratories in Kajiado County, Kenya, shows that at least 65.6% of the respondents reported to have been exposed to at least a type of biological hazard. About 80%, 47%,

Table 1: Questionnaire

Sex	Male (8)	Female (32)
Are you aware of occupational health hazards?	Yes (4)	No (36)
Are you vaccinated against hepatitis B?	Yes (7)	No (33)
Do you wear gloves while handling chemicals?	Yes (10)	No (30)
Do you wear face masks?	Yes (10)	No (30)
Do you think color-coded waste containers are easily available?	Yes (5)	No (35)
Do you think employees are encouraged to be trained in occupational safety matters?	Yes (3)	No (37)

17%, and 8% of the respondents reported to have had exposure to bacteria, parasites, fungi, and viruses, respectively. The high percentages for exposure to bacteria are attributable to the fact that most bacterial habitats surrounding humans are either in digestion systems as normal flora or present as infection. In addition, biological hazards are present in various sources throughout the laboratory such as blood and body fluid, culture specimens, body tissues and cadavers, as well as other workers.

Orme *et al.*^[24] conducted a study titled occupational health hazards of working in the interventional laboratory which showed that the principal findings of their investigation are that, musculoskeletal pain is more common among HCWs who participate in interventional procedures and is highest in non-physician employees; female sex, time per week participating in radiation utilizing procedures, and increasing use of the lead apron are associated with a higher prevalence of musculoskeletal pain; and although they did not observe a higher rate of malignancy in employees exposed to radiation compared to controls within the same departments, conclusions regarding causality are limited by the cross-sectional survey design.

A study conducted by Izadi and Piruznia^[25] titled occupational health hazards among HCWs shows that many chemicals in hospitals are capable of producing adverse health effects through inhalation or by absorption through the skin, which act on the hematopoietic system and damage the lungs, skin, eyes, or mucous membranes. Chemical hazards in the workplace for HCWs include exposure to anesthetic gases, antimicrobial drugs, antineoplastic agents, disinfectant agents, ethylene oxide, formaldehyde, glutaraldehyde, latex, and solvents.

A study conducted by Umar and Aisha^[26] titled common occupational health hazards among HCWs in a Tertiary Health Institution in Bida, North Central Nigeria, shows that occupational health hazard is common among staff in both the clinical and non-clinical departments and most of the staffs that were afflicted reported to the appropriate committee in the hospital. In our study, more than half (56.8%) of the respondents had experienced one or more occupational health hazards since employed. Some of the common occupational health hazards reported by the respondents in the clinical department included needlestick injury 40.7% ($n = 44$), infections with blood-borne organisms such as HBV and HCV 13.9% (15), back pain 7.4% (8), latex allergy 5.6% (6), violence 6.5% (7), stress in 23.1% (25), and others (2.7%). However, those reported by staff in the non-clinical departments included stress of work (32.8%), violence (3.4%), back pain (10.3%), and infection by hepatitis B in one respondent (1.7%).

This was adduced by the respondents to lack of adequate training on safety measures, non-availability of personal protective wears, and ignorance among others.

CONCLUSION

Knowledge and compliance with universal work precautions among these highly exposed laboratory workers is poor.^[27-29] Suggestions to improve deficiencies identified include elaborate training on universal precaution, commitment to safety, and safer work practices by hospital management. Vaccination of staff against hepatitis B should also be done while guidelines for post-prophylaxis should be widely disseminated.

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