

Original Research Article

A cross-sectional study on awareness and practice of universal precautions among laboratory technicians of a tertiary health care facility

Sara Roohen, Kenche Bhavani*, Jyothi Lakshmi Naga Vemuri, Shabnam Anjum

Department of Community Medicine, Osmania Medical College, Hyderabad, Telangana, India

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***Correspondence:**

Dr. Kenche Bhavani,

E-mail: bhavanikenche1969@gmail.com

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ABSTRACT

Background: Biological hazards and health safety issues are a special concern in laboratory technicians who handle blood, body fluids, and tissues which may contain infectious agents. Lack of knowledge of standard precautions has been noted to influence the practice and behaviour change in relation to these precautions requires knowledge. This study therefore aims to study the awareness and practice of universal precautions (U.P) in lab technicians.

Methods: Cross sectional type of study was conducted in the tertiary health care facility (Osmania General Hospital) in Hyderabad district among laboratory technicians of various departments from 1-20/11/18. Random sampling was done and data was collected using a self-administered questionnaire.

Statistical analyses were performed using Microsoft excel 07. Descriptive analysis was done and Chi-square tests were used for establishing association.

Results: The mean age of the respondents was 32.37 years, all of them were graduates by education and the mean length of experience was 5.45 yrs. The mean score for knowledge was 14 (41.1%).

In the domain of practice, the responses were quite satisfactory with majority of the responses being “always” for all the practices, wearing eye shields and face masks was only “sometimes” followed and majority of “not applicable” were for wearing gloves

Conclusions: Although standard and isolation precautions are introduced, the overall performance of respondents was unsatisfactory.

Keywords: Universal precautions, Standard precautions, Laboratory workers, Cross sectional study, Knowledge and practise of universal precautions

INTRODUCTION

Universal precautions (UPs) are a set of precautions or actions designed to prevent HCWs from being exposed to blood and deep body fluids by applying the basic principles of infection control through hand washing, utilization of appropriate protective barriers such as gloves, masks, gowns, and eye shields, safe handling and disposal of needles, and safe decontamination of instruments and other contaminated equipment.¹ The term

standard precaution is replacing universal precautions, as it expands the coverage of universal precautions by recognizing that anybody fluid may contain contagious and harmful microorganisms.²

UPs are important because any health care organization has a responsibility to protect its staff from potential dangers and itself from loss of manpower due to occupational injuries or illnesses.³ Patients may be harmed if staff are uninformed about safe handling of

blood or body fluids, and they may be deprived of appropriate care due to HCWs' inappropriate fears or misunderstandings^{4,5} Surveys have shown that the use of UPs significantly decreases the number of incidents of occupational exposure to blood.^{6,7} Nevertheless, the level of compliance with UPs has been reported to be generally low.^{8,9}

According to WHO, Standard precautions are meant to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized sources. They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients in all settings. These precautions apply when there is a risk of potential exposure to blood, body fluids, secretions, and excretions especially encountered in laboratory workers.

Biological hazards and health safety issues are therefore a special concern in laboratory technicians who are at risk of exposure to: blood borne pathogens while handling contaminated lab samples such as blood or other body fluids, i.e. cerebrospinal fluid, and semen, to *M. tuberculosis* from working with specimens(e.g., acid fast bacilli smears), to hazardous laboratory chemicals and to needle stick injuries or cuts from sharp objects when working with specimens, centrifuge tubes or overfilled sharps containers.¹⁰

Standard laboratory safety practices can minimize such accidental exposure and ensure that each blood sample would be treated carefully with the assumption that all specimens are potentially infectious.¹¹ Occupational exposure resulting in nosocomial infections and further transmission of these pathogens is an area of increasing concern due to spread of resistance and increasing resource use.

The aim of the study was to assess the baseline knowledge and practices regarding standard precautions followed by laboratory workers from different departments of a tertiary health care facility in Hyderabad, Telangana. It is observed that knowledge influences the practice and compliance of these precautions, therefore an assessment of knowledge and practices can help us visualize the extent to which these practices are followed and any gaps between knowledge and practice can be identified.

METHODS

Cross sectional study was conducted in Osmania general hospital, which is a tertiary level health care facility in Hyderabad district of Telangana for a period of one month from 1 November 2018 to 20 November 2018.

Sampling technique

Osmania general hospital has 5 departments concerned with laboratory workers, these include: microbiology,

biochemistry, pathology, ICTC center and TB clinic. Each department had on an average 20 lab workers posted in different shifts of morning, afternoon and night. To achieve a sample size of 70, department register of each department was taken and 14 individuals from each department were selected by random method. After taking consent, 70 respondents were administered the questionnaire in total.

Sample size

Assuming the knowledge and awareness of laboratory workers regarding standard precautions as 50% and taking absolute error as 12%.A sample size of 70 was taken for the study.

Inclusion/exclusion criteria

Inclusion criteria included those workers who were working for a period of >1 month in the facility and who had given consent for the study. Exclusion criteria included students with BSc, MLT degree.

Study tool

Self-administered structured questionnaire was used consisting of two parts-the first part contained information on socio demographic characteristics such as age, sex, duration of working, experience and second part included knowledge-type questions addressing knowledge of the concept in general and hand hygiene and practices related to them. Knowledge type questions included identifying fluids to which SP are applicable and fluids to which they are not applicable, and appropriate precautions followed for different procedures like handling paperwork, collecting and transporting specimens, centrifuging and likewise. Practice wise questions included how frequently (always, sometimes, never, not applicable) was SP practiced like, hand hygiene, use of personal protective equipment (PPE), disposal of waste, and cleaning of spills.

Statistical method/tool

Data was entered and Statistical analyses were performed using Microsoft excel 07. Descriptive analysis was done and Chi-square tests were used for establishing association.

RESULTS

The mean age of the respondents was 32.37 years, all of them were graduates by education and the mean length of experience was 5.45 years. Males amounted to 53% and females amounted to 47% of the total respondents. The respondents worked in the following departments: biochemistry, microbiology, pathology, ICTC center, and DOTS clinic (Table 1).

Table 1: Demographic characteristics.

Characteristic	Percentage (%)
Age group in years	
21-30	47
31-40	31
>40	22
Work experience in years	
1-10	58
>10	42
Age distribution in years	
20-30	34
30-40	26
≥41	10
Education	
Graduates	90
Postgraduates	10
Gender distribution	
Males	53
Females	47
No. of years worked	
0-5	60
6-10	17
≥11	1

Respondents were scored out of 34 questions, in the domain of knowledge. Each correct answer allotted one mark with no negative marking for wrong answers. The mean score for knowledge was 14 (41.1%). Majority correctly identified which fluids to apply SP (mean score=3.5) when compared to which fluids do not come under SP (mean score=1.5), eight questions were asked on procedure and the appropriate precaution to be followed for each one (washing hands/wearing gloves/wearing gown), lastly four questions were asked on previous training and handling of laboratory equipment (Table 2). 25% (n=17) of them had undergone any sort of training on universal precautions in the previous 12 months, 68% answered correctly on shielding machines which emit splash/splatter, 75 % answered yes on using capped tubes while centrifuging specimens and 62% choose yes on whether to decontaminate the container of specimens.

Knowledge regarding procedure precautions was low and the respondents had nil knowledge on when to use disposable gowns for safety, however majority had correct knowledge on appropriate use of gloves while performing procedures when compared to washing hands. Collecting blood, filtering specimens and transferring specimens were the procedures where maximum knowledge was seen (82%), whereas removing rubber stoppers was the procedure where least knowledge was found (62%). In the area of practice, questions were asked regarding frequency of practicing (always/sometimes/never/not applicable) standard precautions (Table 3).

Table 2: Knowledge regarding standard precautions.

Procedure (sum/total)	Correct response (%)
Writing /handling paperwork	
Washing hands	65
Collecting blood with needle and syringe	
Washing hands	76
Wearing gloves	6
Wearing gown	0
Transporting specimens	
Washing hands	75
Removing rubber stoppers	
Washing hands	6
Wearing gloves	59
Wearing gown	0
Vortexing/centrifuging specimens	
Washing hands	12.5
Wearing gloves	62.5
Wearing gown	0
Filtering specimens under pressure	
Washing hands	6
Wearing gloves	75
Wearing gown	0
Transferring /splitting or culturing specimens	
Washing hands	12.5
Wearing gloves	68
Wearing gown	0

Maximum practice was seen on promptly wiping contaminated spills, followed by disposal of sharp objects into a container, least practices was reported in wearing eye shields and disposal of waste into a plastic bag.

DISCUSSION

The level of awareness of SPs is only about 41% in this study which is similar to a study conducted by Goswami et al. among interns in tertiary care facility in western India¹² and a similar level of knowledge on the basic concepts of SP 37.0% was observed in a study on healthcare workers in the Lower Manya Krobo District, Ghana.¹³

The area of concern is the knowledge about fluids to which the SPs are applicable /not; majority of the candidates had very poor knowledge (22%) about fluids to which SPs are not applicable compared to fluids to which the SPs are applicable (44%) which was similar to a study conducted by Motamed et al.¹⁴ among health care workers(HCWs) and medical students in Mazandaran province where many of them had the misconception that the universal precautions should be applied when in contact with sweat(80.8%). This being a very basic element of SPs is a red flag for practice.

Table 3: Frequency of practices among respondents.

Procedure	Frequency (%)
Dispose of sharp objects into a sharp container	Always (87)
	Not applicable (13)
Wash my hands after removing disposable gloves	Always (81)
	Sometimes (19)
Wear disposable gloves whenever there is a possibility of exposure to blood or body fluids	Always (81)
	Not applicable (13)
Wear protective eye shields whenever there is possibility of a splash/splatter to my eye	Always (62)
	Sometimes (25)
	Not applicable (6.25)
Wear a possible face mask whenever there is a possibility of splash/splatter to my mouth	Always (62.5)
	Sometimes (31.25)
Dispose off all potentially contaminated material into a red/labeled bag for disposal as contaminated material	Always (62.5)
	Sometimes (12.5)
	Never (6.25)
	Not applicable (12.5)
Eat/drinking while working in an area where there is a possibility of becoming contaminated with blood/body fluids	Always (6.25)
	Sometimes (12.5)
	Never (68.25)
	Not applicable (6.25)
Promptly wipe up all contaminated spills with a disinfectant	Always (100)

In the area of knowledge regarding procedures maximum knowledge was found on wearing gloves, and zero knowledge was seen in wearing gowns, this might be due to frequency of usage of gloves commonly in day to day practice and thereby having maximum knowledge regarding the same and least use of gowns in regular practice amounting to nil knowledge., a similar pattern was observed among Interns of a Medical College in West Bengal, India conducted by Mukherjee, et al.¹⁵ where 62.4% respondents had correct knowledge regarding usage of gloves.

In the domain of practice, the responses were quite satisfactory with majority of the responses being “always” for all the practices, wearing eye shields & face masks was only “sometimes” followed and majority of “not applicable” were for disposing potentially contaminated material into labeled bags. The results were similar to a study conducted by Wilson E. Sadoh¹⁶ where a high proportion (94.6%) of the HCWs always washed their hands after handling patients and over half of the

respondents (63.8%) always wore gloves, aprons and gowns during surgeries and deliveries and 56.5% never wore eye glasses during the procedures. Another study conducted on cross-sectional study was conducted among Kazakh medical students revealed similar results where only half (51.5%) of the students reported that they always use gloves, and even fewer reported that they always use masks or eye protection.¹⁷ Results were similar to another study done among health care workers in four national hospitals in Kabul, Afghanistan where 90.3% of the respondents reported that they adhered to safe disposal of used needles and sharps and other blood contaminated items, and 92.6% of them reported wearing gloves when they were exposed to deep body fluids or blood products.¹⁸ A similar study in rural northern India also found that HCWs had a low level of overall practice of UP.¹⁹

According to the current study, professional experience does not add to knowledge regarding precautions; no significant association was found between years of experience and knowledge.

Limitation of the study

The study was conducted in a single tertiary care hospital, so the study cannot be generalized to the whole population. The sample size was less thus furthering the notion of non applicability to whole population.

CONCLUSION

In the domain of knowledge, only 25% had undergone training on standard precautions and Knowledge regarding procedure precautions was low with a mean of 41%, thus highlighting the importance of conduct regular training sessions and reinforcing knowledge and practices for the same among lab workers. In addition to regular contact sessions and trainings, ensuring availability of equipment at the appropriate place and time for the lab workers will definitely prove to be a reminder for adequately following the procedural precautions. Ultimately the organizations policies and rules will decide adherence of standard precautions among the workers and ensure their implementation.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Review Committee.

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