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Original Research Article

Knowledge, Attitude, Practice of Biosafety Precautions amongst Laboratory Technicians in a Teaching Hospital

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ABSTRACT

Background: Biosafety among lab technician is an important aspect and needs to be assessed. Present study was conducted to find out awareness of biosafety precautions amongst technicians working in laboratory. It determined the knowledge, attitude, and practice of universal precautions amongst medical laboratory technicians.
Material and Methods: Cross-sectional study of health care workers was conducted using a standardized self-administered questionnaire, which enquired about knowledge, attitude and practices of universal precautions. Participants included; Medical laboratory technicians working in Pathology, Microbiology, and Biochemistry departments in Krishna Institute of Medical Science, Karad.
Result: In this study 19 technicians from Biochemistry, Pathology and Microbiology were involved. Accordingly in knowledge in pathology 50% of study subjects were having average and 50% were having good scores while in biochemistry 25% had average and 75% had good scores and in microbiology 100% of study subjects had good grade. For attitude, in pathology dept 83.3% had average and 16.7% had good grades. In biochemistry 12.5% had poor grades, 75% had average grades and 12.5% had good grades. In microbiology 100% had good grades. For practice in pathology dept 16.7% had poor grades, 66.7% had average grades and 16.7% had good grades. In biochemistry 81.5% had average grade and 12.5% had good grades. In microbiology 100% of study subjects had good scores.
Conclusion: Knowledge, attitude, practice with universal pre-cautions amongst these highly exposed laboratory workers are good, direct need to develop SOPs and to encourage use of Personal Protective Equipment's (PPEs).
Keywords: Biosafety, Lab technician, HIV transmission

INTRODUCTION

There are different types and a great number of hazards which may be encountered in laboratories. Code of practice and guidelines are documented which specify safe practices for particular task or occupations. The technicians in laboratories in Colleges of Medicine and Teaching hospitals generally are faced with many hazards at work and his/her health and safety may be severely jeopardized if adequate preventive protective measures are

not taken. These hazards can be physical, chemical, and blood-borne (cross) infections and even legal actions. The prevention of occupational hazards in laboratories requires a thorough knowledge of the risks and practical measures to be taken. [1]

Biosafety is a concept that promotes safe laboratory practices, procedures and proper use of containment equipment and facilities by laboratory workers.

Laboratory and other health care workers should familiarize themselves with "universal precautions," as defined by Center for Disease Control, these are a set of precautions designed to prevent transmission of Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other blood borne pathogens while handling specimen in the laboratory. Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other blood borne pathogens. [2]

Universal precautions apply to blood, other body fluids containing visible blood, semen, and vaginal secretions. Universal precautions also apply to tissues and to the following fluids: cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids.

Universal 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. In addition, it is recommended that all health care workers 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 [3, 4] while processing these during the tests. However, they seem to have a poor perception of the risk of infections and are not compliant with the basic principles of universal precautions. [5, 6] This system of infection control is, therefore, very important if the risk of transmission of infections in the laboratory is to be minimized, as they may not be aware of the outcome of blood and fluid specimens until they are investigated or contaminated instruments in the laboratory. The purpose of this study was therefore to assess the knowledge about and compliance with universal precautions amongst laboratory technicians in Krishna Institute of Medical Science Deemed University, Karad.

MATERIALS AND METHODS

Study was conducted during the months January & February 2011 to find out the awareness in the laboratories technicians of KIMSU, Karad. For this, a structured self-administered questionnaire developed based on guidelines on universal precautions, which was validated by experts & modified accordingly, was used to collect data for the study. The questionnaire was pretested by conducting a Pilot study. The scoring as for correct '1'score & for wrong as '0' and grading of questionnaire's results were done with the help of statistician and was also validated with Pilot study. Enquiry was made about K.A.P. pertaining to the following points 1) Safety Precaution, 2) Disinfection of working area, 3) Handling of blood and body fluid, 4) Hand washing, 5) Disposal of waste, 6) Handling and transport of specimens, 7) Dealing with sharp injury.

Study subjects:

All the Medical laboratory technicians working in Department of Pathology (n-06), Microbiology (n-05) and Biochemistry (n-08) in Krishna Institute of Medical Science Deemed University, Karad.

Data collection:

It was interviewed personally, verbally with the questionnaire to all technicians in department of pathology, microbiology and biochemistry. They all are qualified as BSc DMLT., amongst laboratory. Participants were scored on the items above biohazards and biosafety competence scale. Grading was all to participant was graded as Good, Average and poor for each of knowledge, attitude and practice, based on scoring he or she got.

Good – 22-25 marks
Average- 18-21 marks
Poor – 14-17 marks

RESULTS

Table no.1: Distribution of study subject- Department, age, sex wise.

Department	Number	Percent
Pathology	6	31.6
Biochemical	8	42.1
Microbiology	5	26.3
Age		
Mean age	35.74	
Standard deviation	7.723	
Minimum age	25	
Maximum age	48	
Gender	Number	Percent
Female	10	52.6
Male	9	47.4

Table no 1 shows distribution of study subjects according to their department, age and sex. Out of 19 study subjects 42.1% were from Biochemistry, 31.6% from Pathology and 26.3% from Microbiology. The mean age of study subjects is 35.74 with minimum age of 25 and maximum of 48.Acoording to gender wise 52.6% were females and 47.4 were males.

Table 2: Status of knowledge, attitude, practice of study subjects.

	Number	Minimum	Maximum	Mean	Std.Deviation
Pathology					
Knowledge	6	20	24	21.83	2.041
Attitude	6	19	25	21.00	2.191
Practice	6	17	23	20.00	2.191
Biochemistry					
Knowledge	8	20	24	22.25	1.389
Attitude	8	17	22	19.75	1.669
Practice	8	18	22	19.88	1.458
Microbiology					
Knowledge	5	24	24	24.00	.000
Attitude	5	22	22	22.00	.000
Practice	5	22	22	22.00	.000

Table no 2 shows the minimum and maximum score with their mean and standard deviation for the Knowledge, Attitude and Practice of study subjects. The minimum score for knowledge was found in both departments ie Pathology and Biochemistry with mean and SD of 21.83±2.041 and 22.25±1.389 respectively, while in microbiology all answers to the questions were correct corresponding a men and standard deviation of 24±0.000 respectively. Similarly in attitude minimum score was found in biochemistry department then pathology and all the correct answers in microbiology ie mean and SD of 19.75±1.669, 21±2.191 and 22±0.000 respectively. Similarly in practice minimum score was found in pathology followed by biochemistry and then microbiology with mean and SD of 20±2.191, 19.88±1.458, 22±0.00 respectively. The microbiology department fared excellently by scoring

complete marks out of the questionnaire's given.

Table no 3: Grades for the departments according to knowledge, attitude and practice.

	Poor	Average	Good
Pathology			
Knowledge	00	3(50%)	3(50%)
Attitude	00	5(83.3%)	1(16.7%)
Practice	1(16.7%)	4(66.7%)	1(16.7%)
Biochemistry			
Knowledge	00	02(25%)	06(75%)
Attitude	1(12.5%)	6(75%)	1(12.5%)
Practice	00	7(81.5%)	1(12.5%)
Microbiology			
Knowledge	00	00	5(100%)
Attitude	00	00	5(100%)
Practice	00	00	5(100%)

The table no3 shows grades of various departments according to knowledge, attitude and practice, accordingly in knowledge in pathology 50% of study subjects were having average and 50% were having good scores while in biochemistry 25% had average and 75% had good scores and in microbiology 100% of study subjects had good grade. For attitude, in pathology dept 83.3% had average and 16.7% had good grades. In biochemistry 12.5% had poor grades, 75% had average grades and 12.5% had good grades. In microbiology 100% had good grades. For practice in pathology dept 16.7% had poor grades, 66.7% had average grades and 16.7% had good grades. In biochemistry 81.5% had average grade and 12.5% had good grades. In microbiology 100% of study subjects had good scores.

ANOVA Test

- Knowledge-Pathology and Biochemistry (F=3.332, p=0.027), Pathology and Microbiology (F=3.332, p=0.052) .
- Attitude-Pathology and Biochemistry (F=2.976, p=0.029), Pathology and Microbiology (F=2.976, p= 0.052).
- Practice-Pathology and Biochemistry (F=3.264, p=0.029), Pathology and Microbiology (F=3.264, p=0.052).

Within Group comparison done by doing ANOVA test showed that there was no significant difference in between the all three departments while when compared between groups pathology and biochemistry showed significant difference(F=3.332 ,p=0.027) borderline difference in pathology and microbiology(F=3.332, p=0.052) in knowledge. In attitude between groups pathology and biochemistry showed significant difference(F=2.976, p=0.029) borderline difference in pathology and microbiology(F=2.976 ,p= 0.052) and in practice between groups pathology and biochemistry showed significant difference(F=3.264, p=0.029)) borderline difference in pathology and microbiology(F=3.264 ,p=0.052).

DISCUSSION

The objective of safety programme depends on the type of the institute, nature of the work being done and the level of technical expertise of laboratory staff. In the current study we could see the knowledge, attitude and practice of the all departments in the study fared well. In Pathology department nearly half of the participants had good knowledge and other half had average knowledge, maximum (83.3%) no of participants had average attitude and maximum no (66.7%) had average practice. In Biochemistry dept Maximum no (75%) had good knowledge and average attitude (75%) and average practice (81.5%). But Microbiology department all the participants had good knowledge, attitude as well as practice. This interdepartmental variation seen might be due to awareness and the knowledge among the participants, probably the word microbiology in the request form of biohazardous nature of the samples and hence better KAP observed in Microbiology technicians. Similar study conducted by

Ejilemele AA, Ojule AC in Department of Chemical Pathology, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria showed that Gross deficiencies were found in the knowledge, attitudes and practice of laboratory safety by laboratory staff in areas of use of personal protective equipment, specimen collection and processing, centrifuge--related hazards, infective hazards waste disposal and provision and use of First Aid Kits. Issues pertaining to laboratory safety are not yet given adequate attention by both employers and employees in developing countries in this year of resurgence of diseases such as HIV/AIDS and Hepatitis Band C, is emphasized. [7] This difference in the results from the current study may be due to the awareness among the laboratory staff, knowledge present among them and the syllabus for the training of the laboratory technicians. Another study done by M.C Izegbu, O. O. Amole, + G.O.Ajayi at two Colleges of Medicine and their Teaching hospitals in Lagos State, Nigeria showed that participants wear gloves during laboratory work but 81.2% wear a single pair. Nylon gloves were commonly used (57%) followed by latex gloves (43%). 91.5% are not immunized against hepatitis B virus (HBV).82.0% of the participants do not feel that the use of masks is necessary in laboratory. [8] In our study all the participants from all the three departments completely used disposable latex rubber gloves (100%) and immunization for HBV was found to be 79% in all the departments. This difference in the results may be due to differential awareness regarding safety and importance of immunization.

CONCLUSION AND RECOMMENDATIONS

Knowledge and compliance with universal precautions among these highly exposed laboratory workers is good. Suggestions to improve deficiencies identified include elaborate training on universal precautions, commitment to safer work practices by hospital management. In laboratory awareness about safety should be increased among staff members. Laboratory safety has to be a part of the overall quality assurance programme in hospitals.

In order to ensure biosafety practices, there is direct need to develop SOPs and to encourage use of Personal Protective Equipments (PPEs) while handling clinical specimens. Institutional biosafety support to control, maintain, and record nosocomial infection and accidents, protective equipment proper specimen collection and processing and infective waste disposal should be initiated. Regular training on biosafety principles and self-hygiene for laboratory workers is needed along with the appointment of a biological safety officer to oversee the proposed work activities, procedures, equipment, personnel, storage, material transfer and transport, and proper destruction of biological material. This officer should indicate risk analyses and develop written standard operating procedures for the laboratories.

There should be a registration system for laboratories at the national level. Before issuing a license to any laboratory, proper evaluation should be performed to examine laboratory design, proper ventilation, entrance and exit, by experts to ensure laboratory biosafety.

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