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Study Of Knowledge, Attitude And Performance On Lab Operations Of Clinical Lab Technicians At A Tertiary Care Teaching Hospital

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Abstract

Background: *Proper diagnosis of the disease plays a crucial role in concluding the patient's condition without which medical treatment or surgery cannot be obtained. The role of a clinical lab technician is critical for proper diagnosis and interpretation of results. Therefore, adequate knowledge, their attitude and the appropriate practice of handling clinical samples are vital to generating accurate and reliable results to proceed with the clinician's diagnosis and treatment.*

Objectives: *The primary objective of this study is to evaluate the knowledge, attitude and performance in laboratory operations amongst clinical lab technicians at Srinivasan Medical College and Hospital (SMCH), Tiruchirappalli (Tamil Nadu), a tertiary care teaching hospital.*

Methods: *A cross-sectional study of health care workers was conducted using a pretested self-administered questionnaire, which inquired about knowledge, attitude and performance related to laboratory operations.. Only those who gave their consent to participate in the study were chosen after the ethical approval. The questionaries were distributed via Google Forms. The data were analysed using the Statistical Package for Social Sciences (SPSS) statistical software, version 28.*

Results: *The current study shows that the laboratory technicians working at SMCH during the study period got 47% of good scores in knowledge and the majority of them received good scores in attitude and performance. 78.1% gave the correct response for the colour of the blood collection tube. 90% of them disagreed with eating the edibles inside the lab. 81.3% of them know the importance of attending the training program on biosafety management.*

Conclusion: *This study demonstrated that the laboratory professionals working at the SMCH have been adequately trained, which was reflected in their scores obtained for knowledge, attitude and performance. However, regular training is important to update their knowledge and to improve the quality of laboratory service.*

Keywords: *clinical technicians, laboratory operations, knowledge, attitude, performances*

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I. Introduction

Laboratory reporting has a great influence on clinical decision-making. With this high degree of influence, the quality of laboratory testing and reporting is of utmost importance[1]. Clinical laboratories are healthcare facilities providing a wide range of laboratory tests that aid physicians in carrying out the diagnosis, treatment, and management of patients. These laboratories are manned by medical technologists trained to perform various tests on samples of biological specimens collected from their patients [2]. The classifications include clinical chemistry, microbiology, haematology, blood banking, serology, histopathology, cytopathology and molecular biology, which reveals that these facilities can provide quality laboratory tests that are significant for addressing medical and public health needs [2,3,4]. Clinical laboratories perform diagnostic tests in an analytical and strict manner. Generally, there are three phases of the laboratory testing process that each facility should follow. Standard operating procedure (SOP) manuals and job aids are written for guidance in carrying

out each step of the phase: pre-analytical, analytical, and post-analytical [5,6,7]. Laboratory analytical turnaround time is a reliable indicator of laboratory effectiveness while the pre-and post-analytical phases are equally important for the laboratories where TAT is concerned [8].

Medical errors also play a vital role in causing severe harm to patients as well as it creates a huge impact on the national economy. Many areas of health care are struggling with the issue of patient safety whereas laboratory diagnostics has always been a forerunner in pursuing medical errors [9]. Clinical laboratories, especially in recent days are usually known for their expertise in handling laboratory machines and instruments that do the majority of sample testing, still, these facilities heavily rely on the laboratory professionals that ensure the results are accurate and reliable [10].

Providing good quality, diagnostic testing is the goal of all clinical laboratories. To attain this goal, several issues and problems need to be addressed, which ultimately underline the need for improving laboratory capacity. Addressing the exact resources, training under supervision, budget planning, quality assurance, logistics and supply, biosafety precautions, equipment management and other relevant laboratory aspects were found to be necessary to optimize laboratory services provided to patients. As the challenges faced by clinical laboratories constantly arise, the clinical technician should be able to recognize the value of its significance and the welfare of the patients[10].

Clinical technicians are exposed to various occupational risks and their health may be endangered if adequate preventive measures are not taken. It is imperative to have good knowledge, attitude and practice of health care professionals working at the tertiary care teaching hospital to provide a precise report for the clinicians[11,12,13,14,15]. There is a lack of research on their knowledge, attitude and practice (KAP) with respect to laboratory operations. The purpose of the current study is therefore to access the knowledge, attitude, and performance of the clinical lab technicians regarding the laboratory operation in order to access and improve the standard and quality of the laboratory services at SMCH, Tiruchirappalli.

II. Material and Methods

A cross-sectional study was carried out among 33 lab technicians working at SMCH using a pretested questionnaire that enquired about knowledge, attitude, and performance in laboratory operations in the month of April 2022 after the ethical approval. The clinical lab technicians (Biochemistry, Microbiology, Pathology, Molecular Biology (NABL accredited) and blood bank) working in the SMCH (Tiruchirappalli) during the study period and among those who gave their consent to participate in this study were included. The questions were distributed via Google Forms and the data was analyzed using SPSS version 28.

III. Results

The lab technicians who worked in the SMCH during the study period were included in the study. All technicians are certified for Diploma in lab technician (DMLT) and few of them have completed their Bachelor's and Master's degree courses. Of those, 31 were vaccinated for hepatitis B. The unvaccinated technicians were intimated to start the vaccination series. When the participants were asked about their work experience in the laboratory, 36.36% of them had 1–5 years of experience. 21.2% of the professionals had 5–10 years of experience and 6% of them had > 10 years of experience. Among those, 47% of the clinical lab technicians received good scores in knowledge, and 50% of them got an average score and out of those, 3% had poor knowledge of their work. (Figure 1a) The majority of technicians received good scores in attitude and performance (Figures 1b and 1c). 78.1% correctly identified the colour of the blood collection tube for conducting FBS. 75% of them have adequate knowledge of correct reference intervals for biochemical parameters. Most of the laboratory professionals have good knowledge knowing the significance of the test in the aspects of clinical decisions, e.g. 87.5% gave correct response for Troponin I elevation occurring in heart failure. 28.1% gave the correct response for improving the resolution of the microscope (supplementary table 1; Figure 3a). 93.4% agreed to the calibration of the pH meter before usage. 90.6% gave the correct response for the disinfection used for the blood spillage area. 90% of them disagreed with eating the edibles inside the lab (supplementary table 2; Figure 3b). 90.6% of them have an excellent attitude towards handling conflicts in the laboratory. 81.3% of them know the importance of attending a training program on biosafety management. 100% of the technicians agreed that wearing gloves while handling the specimen was essential. 87.5% of technicians are educated about the hepatitis B vaccination. 96.9% accepted the importance of maintaining proper records about the accident and injuries. 65.6% of the laboratory professionals know the dilution procedure. 84.4% of them are aware of biosafety cabinets and their working procedure. 68.8% gave the correct response for taking the immediate action of wiping with hypochlorite when there is any spillage on the working bench. 90.6% disagreed to wear flowers and using perfumes when they are on duty. 93.8% of the technicians gave the correct response to balance the load while using the centrifuge. 90.6% recommended that the laboratory should be placed closer to the patient care centres and OPD. 93.8% agreed to give proper instructions

to the subordinates to follow proper colour coding for waste disposal 96.9% of technicians properly follow the hand hygiene steps (supplementary table 3; Figure 3c).

IV. Discussion

Clinical laboratories play a crucial role in the diagnosis, prognosis, and overall management of patient care. In 2021, WHO published a report and called on countries to prioritize clinical testing to ensure healthy populations [16]. Sayed S et al, (2018) highlighted the critical need for human resources to attract and retain skilled staff and to revise responsibilities within the clinical laboratories to improve infrastructure and supply chain modifications and obtain quality management. It involves the systematic approach of clinical advice or request for a particular investigation, analysis of the collected specimen, interpretation of results and appropriate reporting within the turnaround time [17].

The results of the current study show that the average overall percentage of correct responses for knowledge, aptitude and performances are 75.91%, 90.24%, and 84.55% respectively (Figure:2a, 2b, 2c). However, it has certain limitations such as a limited number of laboratory professionals who were employed during that particular time period were included in the study.

The majority of laboratory professionals are aware of hepatitis B vaccination, which reflects their good knowledge and regulations for the protective immunization prior to employment. Every laboratory worker should be aware of the potential hazards in their workplace and it is important for them to ensure safety in their practices [11]. In line with this concept, 84.4% of the clinical technicians working at SMCH agreed that biomedical waste management is part of the laboratory guidelines. 93.8% of them have good performance in pre-analytical error management, which is the real matter of consideration. 99% of the laboratory professionals agreed that they follow standard operating procedures (SOP) while performing the tests[18] . The majority of them are aware of colour coding for waste management. Significantly, most of them are acquainted with the importance of turnaround time (TAT). TAT is an important parameter for the laboratory as well as for the hospital in assessing the laboratory service[19]. Needlestick Injury is a major occupational health and safety issue among healthcare workers. In India, the incidence of needle stick injury is high, but surveillance is poor with scarce authentic data [20]. 96.9% of laboratory professionals working at SMCH agreed to report needle stick injuries to the nodal office.

The present study revealed the current status of knowledge, attitude and performance about laboratory operations of the clinical technicians working at SMCH. Further studies and analysis should be done on these settings and based on that, regular training sessions should be conducted to enrich the overall knowledge, attitude and performance of the technicians and enhance issuing of quality of reports.

V. Conclusion

The current study concludes that the response rate and their overall score towards all the parameters were average. The lack of knowledge may be attributed to inadequate training during their services. The regular training program is mandatory to update their knowledge, attitude and performance on laboratory operations and to improve the quality of laboratory management and such questionnaire could be useful to assess the new technician for recruitment thereby improving the standard of the clinical laboratory reports and institution services to its patients.

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Conflicts of interest: The authors disclose no conflicts of interest

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