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Editorial

Decile Strategy to Create a Biocontainment Ecosystem at Germ Laboratory

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Abstract

Ain Shams University's (ASU) Faculty of Medicine's Microbiology Research Laboratory (MRL) is a biosafety research facility that is situated on the university's main campus in Cairo. Between October 2019 and January 2020, a number of initiatives were carried out with the aim of enhancing the department's biosafety capabilities. These initiatives included raising awareness and educating laboratory staff, including those in non-health professions, about standard biosafety practises and procedures. Three levels of biosafety expertise were assigned to MRL employees: tier (1): no or little knowledge; tier (2): basic knowledge; and tier (3): satisfactory understanding. Their job responsibilities were taken into consideration when designing tier-based activities. Results: 44 chosen laboratory employees were trained in biosafety procedures: 13 made up of tiers 1, 2, and 3, and 12 were from tier 1. tier (3). (3). Regular follow-ups allowed for the evaluation of how the implemented training plan affected the behaviours and expertise of every member of the laboratory staff. Health-related professionals now have 60% more knowledge overall. Additionally, the International Federation of Biosafety Association has certified 6 employees in biosafety (IFBSA). In conclusion, creating a biosafety culture inside microbiology research labs is essential to safe research procedures. Research advancement will be made possible without compromising environmental or public health safety by creating local, state, and federal biosafety legislation and policies(Avni R et al ., 2017).

Keywords: Biosafety Research laboratories, Tier-based activities, Laboratory acquired infections, Microbiology

INTRODUCTION

(Baumann K et al., 2020) Working and researching in research labs is fraught with risks connected to handling samples, the spread of a wide variety of invasive microbes, and the ultimate disposal of infectious waste. Researchers, technicians, and students are more likely to contract illnesses related to lab work (LAIs). (Cole S A et al., 2017) 1 Nevertheless, given that "exposures and consequent (Mason NM et al., 2017 infection occur not only as the result of overt accidents but also during the performance of routine procedures," estimating the actual number of laboratory workers involved in LAIs and pinpointing the exact source of infection have become a constant challenge for laboratories. 2 Therefore, identifying biosafety hazards and implementing excellent microbiological techniques can considerably reduce LAIs3, 4.(Luo Y et al., 2017)

(Wang H et al., 2017) The development and implementation of the necessary laboratory biosafety and biosecurity procedures are frequently hindered in underdeveloped nations. Due to poor leadership understanding, insufficient money, and a dearth of technical expertise, projects are frequently inconsistent and fragmented. In light of this, developing a culture of biosafety inside the Microbiology Research Laboratory (MRL) and strengthening biosafety (Mason N M et al., 2017) laboratory competencies through short-term activities were essential to safe research practises. MRL is a biosafety level-2 (BSL-2) research facility situated on the main campus of the Faculty of Medicine at Ain Shams University in Cairo. In the context of a medical research laboratory, it intended to cater to research activities that involve numerous pathogens, including fungi, bacteria, and viruses that belong to risk groups 1 and 2. (Luo Yet al., 2017) Bacteriology and Mycology Unit (BMU) and Molecular

and Serology Unit make up MRL (MSU). The following biosafety procedures were followed with regard to BMU. BMU is a lab that is essentially set up. Without any physical separation between clean (such as media preparation) and contaminated processes, the layout of BMU was created to support all culture-based procedures including pathogen identification and susceptibility testing in a single room (e.g. clinical samples processing). An autoclave for media sterilisation and an uncertified biosafety cabinet are both provided in the primary laboratory work space (clean autoclave). A second autoclave (dirty autoclave) is situated in a tiny, adjacent trash room and is used to clean reusable glass objects. Culture plates and other disposable goods are kept in the (Dagum C et al ., 1997) rubbish room until they are sent for cremation. Recognizing that the lack of national and local biosafety rules has hampered the implementation of biorisk at MRL, we have reached an understanding with the head of The department should proactively create a biosafety manual and departmental biosafety policy. To begin with, we took advantage of a financial opportunity provided by CRDF-global to create a short-term training programme for every member of the laboratory staff. The main goals of this plan were to increase laboratory staff awareness of the concept of biorisk management (BRM), identify biosafety gaps by conducting a local risk assessment, strengthen the capabilities of the biosafety laboratory, and finally build on the previous initiatives to create the first draught of the departmental biosafety manual. Between October 2019 and January 2020, a variety of training activities were conducted in order to express this knowledge (Cole S A et al., 2017).

Methodology

We built a curriculum that was appropriate for the biosafety backgrounds of each staff member and focused on the essential biosafety ideas that needed to be taught and reinforced within MRL. These short-term activities were designed to accomplish the plan's objectives. Powerpoint presentations, group discussions, hands-on training, and on-site simulation exercises were just a few of the varied activities used to assure the trainees' full participation and to enhance the knowledge acquired in such a brief time. According to their availability, laboratory employees, including those in non-health professions (such as administrative personnel, cleaners, and waste handlers), were invited to participate in biosafety exercises. According to their level of biosafety knowledge, the staff was divided into three categories: tier (1) non-health professions with no to little knowledge, tier (2) demonstrators and assistant lecturers with basic knowledge, and tier (3) senior staff with satisfactory knowledge based on their extensive teaching and real-world infection control experience (IC). Activities based on tiers were carried out in order. In addition to external Egyptian experts from the Central Public Health Laboratory (CPHL), Theodor Bilharziasis Institute, Central Laboratory for Evaluation of Veterinary Biologics (CLEVB), and WHORegional, each workshop was led by biosafety experts from the Medical Microbiology and Immunology Department. the Eastern Mediterranean office. All of the instructors have completed in-depth biosafety training from international organisations, attended conferences on the subject, and taken the initiative to create biorisk management programmes in their individual institutions. training programme

All training materials were taken from the CDC's Biosafety in Microbiological and Medical Laboratories and the WHO's Biosafety manual (BMBL).

Tier (1):

In accordance with their responsibilities within MRL, laboratory staff received training on common biosafety procedures. The training activities were limited to interactive sessions, practical exercises, and role plays to keep the trainees interested and give them a chance to think about the difficulties they face on the job every day. Training materials included instructional images, films, and a biosafety package with UV light, glue germ oil, and glue germ gel.

Tier (2):

Demonstrators and assistant lecturers learned about the BRM concept and the assessment, mitigation, and performance (AMP) model for the first time during the course of three consecutive days. Personal protective equipment (PPE), class II biosafety cabinet best practises, and appropriate waste management were all covered in hands-on training for excellent microbiological procedures. An interactive session was also used to give information about shipping and transferring infectious products in accordance with international rules. To show decontamination expertise, a biosafety kit was used in a spill management exercise. All workshop participants had the chance to put their newly acquired knowledge to use on the last day by using risk assessment check lists adapted from global biosafety standards to identify current biohazardous hazards.

RESULTS

In accordance with their availability, 44 MRL employees aged 28 to 58 received biosafety training between October 2019 and January 2020: 12 from Tier 1, 19 from Tier 2, and 13 from Tier 3. .

Tier 1: A significant gap in non-health professionals' hand hygiene practises was found. Other flaws in the environmental decontamination exercise included omitting the pre-cleaning stage and improperly calculating the dilution of the disinfectant that was utilised.

Among the 19 participants, 17 have submitted their pre- and post-test evaluations, placing them in Tier 2. 60% more information was learned as a result of the course. Significant shortcomings discovered during risk assessment included: 1-the absence of departmental and institutional biosafety policies with explicit guidelines and obligations 2. Lack of

a staff assurance monitoring system compliance Lack of biosafety training plans for all laboratory staff, including pre-employment safety training, lack of incident reporting procedures, improper handling of waste, limited laboratory biosafety expertise, improper handling of waste, and finally, a lack of clear delineation between clean and contaminated areas within the laboratory.

Tier 3: To create the initial draught of the biosafety document, 13 senior staff members and IC specialists met. Each of the three groups made up of trainees was given one of the chosen techniques to practise. Three priority procedures were included in the relevant draught: trash management, PPE donning and doffing, and spill management.

DISCUSSION AND CONCLUSION

The present COVID-19 pandemic has brought to light the long-standing biosafety hazards in research and clinical labs, emphasising the need for putting in place a strict BRM framework to prevent and address public health threats.

The main causes of bottlenecks in low- and middle-income nations are a lack of leadership awareness, the difficulty to sustain funding for safety equipment, and a lack of experience in enforcing the application of safety practices. To prevent effort dispersion and duplication, it is therefore encouraged at the national level to move from individually led activities to leadership-driven activities.

REFERENCES

1. Avni R, Nave M (2017). Wild emmer genome architecture and diversity elucidate wheat evolution and domestication. Sci .357: 93-97.
2. Baumann K (2020). Plant gene editing improved. Nat Rev Mol Cell Biol. 21: 66-66.
3. Cole S A, Xiong W (2017). Agricultural insurance and economic development. Annu Rev Econom .9: 133-143.
4. Mason N M, Jayne TS (2017). The political economy of fertilizer subsidy programs in Africa: evidence from Zambia. Am J Agric Econ. 99:705–731.
5. Luo Y, Long X (2017). Decoupling CO2 emissions from economic growth in agricultural sector across 30 Chinese provinces from 1997 to 2014. J Clean Prod.159:220-228.
6. Wang H (2017). The economic and social performance of integrated photovoltaic and agricultural greenhouses systems: case study in China. Appl Energy.190: 204-212.
7. Mason N M, Jayne TS (2017). The political economy of fertilizer subsidy programs in Africa: evidence from Zambia. Am J Agric Econ. 99:705–731.
8. Luo Y, Long X (2017). Decoupling CO2 emissions from economic growth in agricultural sector across 30 Chinese provinces from 1997 to 2014. J Clean Prod.159:220-228
9. Dagum C (1997). A new approach to the decomposition of the gini income inequality ratio. Empir Econ, 22: 515-53
10. Cole S A, Xiong W (2017). Agricultural insurance and economic development. Annu Rev Econom .9: 133-143