Risk Assessment of Decontamination Procedures at Princess Haya Biotechnology Center - Jordan

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Introduction

Decontamination in the biological laboratories must be carried out to ensure that any item is safe to handle and free from risk of disease transmission, the purpose of decontamination is to protect laboratory workers, institution, environment, and anyone who enters the laboratory or handles laboratory products away from the laboratory. In the present study at Princess Haya Biotechnology Center (PHBC), assessment was done to evaluate the effectiveness of decontamination procedures and to define any gaps in the work situation. Risk assessment results were used to influence mitigation measures to prevent disease transmission in healthcare settings, and to decrease risks associated with improper decontamination. This study was a step forward added to other efforts to improve the biosafety practices at PHBC based on the results of comprehensive risk assessment.

Objectives

The objectives of this study were to assess the decontamination procedures at PHBC, to assess staff awareness, training, SOP, procedures and practices, to use the risk assessment results to select appropriate decontamination strategies, and to enhance the implementation of biorisk management system at PHBC.

Method

Several methods were used to perform risk assessment, including observation of the working situations and staff practices, evaluation of previous problems, and revision of standard operating procedures (SOP). To support and supplement information collected; interviews were conducted with the managers responsible for environmental healthcare and infection control units. All data collected by these methods were used to develop a survey questionnaire for lab workers, housekeepers, and trainees. The purpose of the questionnaire was to assess the level of awareness, practices, SOP, risk perception, and training needs. The respondents were also asked to indicate their recommendation.

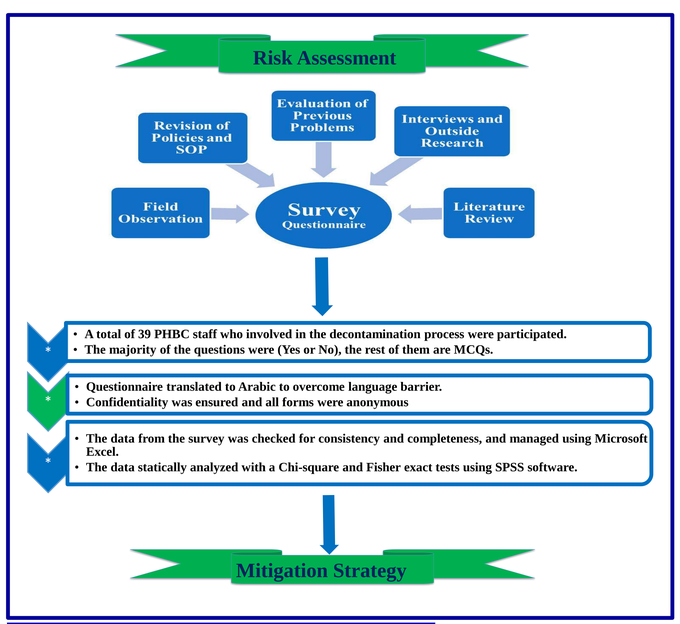

Figure 1: Method Approach

Category	Examples of Questions
Awareness	- Do you know the differences between decontamination procedures for different objects? - Do you know what are the factors that affect disinfectant work? - Do you know what are your responsibilities in the decontamination processes? - Did you read the MSDS for the disinfectant before use?
Practices	- How do you use the disinfectant? - Do you clean before disinfection? - Is there any person who audit and evaluate these processes regularly? - Is there a documentation or reporting system?
SOP	- Is there an SOP for decontamination? - Are you aware of these standard operating procedures (SOP)?
Mitigation	- Did you receive any training before on decontamination? - Do you need more training ? Lectures? Signs or posters? - Does your institution provide annual education?
Personal Opinion & Suggestion	- Do you trust the decontamination procedures will not cause harm for staff, institution, and environment? - Do you think the current decontamination processes are effective? - Do you have any suggestions to develop the system?

Table 1: Examples of Survey Questions

Results and Discussion

Results analysis of the collected data and survey questionnaire showed that there were some gaps in the decontamination process due to lack of training, awareness, and staff risk perception, though no previous problems were reported. Observation revealed that they had some mitigation measures but not necessarily been used appropriately, they were aware about some issues but their practices and answers showed the need to raise their awareness. The questionnaire results showed that 82% of the participants were aware of risks as they believed, while 50% did not know the differences between decontamination procedures for different objects (more of the questionnaire results are shown in the figures below). The statistical analysis results approved significant correlations (P value <0.05) between awareness, training, SOP, staff practices, and their trust. Results indicate that the decontamination is affected by perception of risk and training programs. The designed mitigation plan included writing decontamination SOP, training by specialist, posting educational signs and posters to remind employees to follow good lab practices, and a program to vaccinate unimmunized staff against Hepatitis B virus.

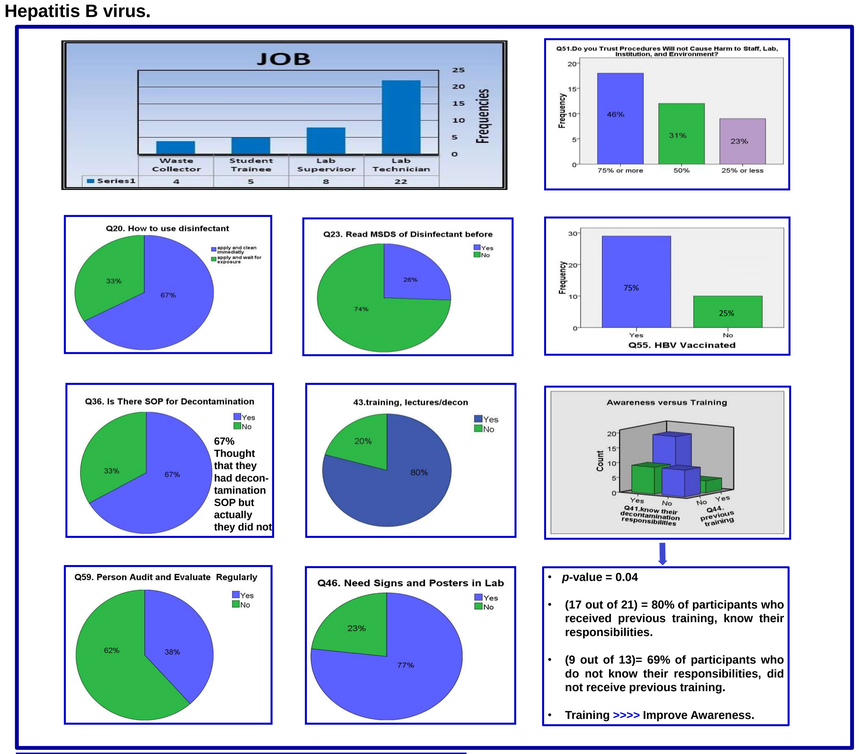

Figure 2 : Result Analysis

Q ↔ Q	Significant Correlations	Category vs. Category	P value <0.05
18 ↔19	69% Don`t trust disinfectant ↔ Don`t know disinfectant effectiveness against which biological agents	Awareness vs. trust	0.01
37↔41	Not aware of SOP ↔ Don`t know their responsibilities	SOP vs. Awareness	0.01
44↔53	Received previous training ↔ Know importance of effective decontamination process	Training vs. Awareness	0.04
21↔47	Received annual education ↔ Do pre-cleaning	Education vs. Practice	0.008
47↔50	Received annual education ↔Think decontamination process is effective	Education vs. opinion	0.001
41↔51	Don`t know responsibilities ↔ Trust that procedures do not cause harm by ≤50%	Awareness vs. trust	0.002

Table 2: Examples of Some Significant Correlations

Conclusion

Improving health and safety does not cost a lot, but failure to take simple precautions can cost a lot more if an accident happens. This study improved the decontamination procedures at PHBC, and provided higher level of protection for staff, product, environment, and surrounding community from potential harm due to inappropriate decontamination procedures, and mitigate the accidental exposure to biological agents. The next steps are to assess the risks and follow on mitigation measures for other activities that handle biological materials, and to look for validation methods such as post survey, using indicators, and unannounced regular audition to ensure that the system is working safely.

Recommendation: Behavioral Biosafety

One of the main purposes of implementing sustainable biorisk management system is to change the people behavior when they handle biological agents, and motivate them to move from knowing what to do to actually doing it. Applying required mitigation such as training, writing SOPs, signs, and auditing could change people awareness but not necessarily their actions. One of the critical factor to consider for changing safety behavior is the link between beliefs and behaviors; behavior is driven by the subconscious mind, it is driven by feelings, thoughts, and beliefs. As the study results have shown if people don`t believe or trust in a certain issue they will not do it. If a real change is a necessity then focus should be on what shape and sustain safe lab behavior; for that to occur individuals must understand risk consequences, biosafety benefits, be provided with the required skills and resources, and have the belief in personal ability to commit. To spread the biosafety culture, positive reinforcement strategies should be utilized to teach new behavior, and not the negative reinforcement that suppresses behavior temporarily. Finally, laboratory staff must feel supported by leadership; the leaders may serve as role models to influence changes.

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