

Evaluation of the Biosafety Training Developed in the Primary Health Care Clinical Laboratory

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ABSTRACT

Introduction: Biosafety constitutes a strategic approach to analyze, evaluate and manage, as well as to propose a system of actions to eradicate risks.

Materials and methods: A prospective, analytical, observational study with a cross-sectional quantitative approach was carried out in three clinical laboratories of primary health care, selected by simple random sampling. The universe was made up of 37 workers, with inclusion criteria that were to be a laboratory worker and who had agreed to participate in the study and the exclusion criteria to be a student in training. The information collection instrument was the questionnaire, which contains 6 elements to evaluate related to biosafety training. The variables considered, age, sex, years of work. The variables were worked with an analytical evaluation in which percentages, mean, and Standard deviation were considered.

Results: 45.9% of the workers had not received training in biosafety. The three polyclinics show a similar pattern of training ($2 = 2.269$, $p = 0.322$). After the training intervention received, 100% of the respondents evaluated it as sufficient and 89.1% above their expectations.

Conclusions: Deficiencies in knowledge about biosafety were identified that were reversed with a training intervention that was considered sufficient by 100% of the respondents, therefore it is considered effective.

KEYWORDS: Biosafety, Clinical Laboratory, Knowledge

INTRODUCTION

The word biosafety comes from its components: "bios" which means life and "safety" which is equivalent to protection, for which the term as a whole expresses protection of human life from any type of risk through the permanent application of the various standards and existing systems in each case. (1)

Biosafety should be conceived as a set of preventive measures aimed at achieving attitudes and behaviors that reduce occupational risk factors from biological, physical or chemical agents that affect all those who are in the healthcare environment. (two)

According to the World Health Organization (WHO), "Biosafety is a strategic and integrated approach to analyze and manage relevant risks to human, animal and plant life and health and the associated risks to the environment. It is grounded in recognition of the critical linkages between sectors and the potential for threats to move within and between sectors with system-wide consequences. (3)

In the area of health, this issue generates reflections on the part of professionals, since they are more susceptible to contracting the disease as a result of work accidents, through procedures that include biological, chemical, physical and ergonomic risks. (5)

For all of the above, the following investigation is carried out with the objective of evaluating the training in biosafety developed in the clinical laboratory of the Primary Health Care object of study.

MATERIAL AND METHODS

A prospective, analytical, observational study with a quantitative cross-sectional approach was carried out in three primary health care clinical laboratories, located in Havana, from January to December 2019, selected by simple random sampling.

A prospective, analytical, observational study with a quantitative cross-sectional approach was carried out in three primary health care clinical laboratories, located in Havana, from January to December 2019, selected by simple random sampling. In order to determine the level of knowledge about biosafety in the personnel of three primary health care clinical laboratories called A, B and C in the study so as not to reveal their names, the sample covered the entire universe of workers in the object clinical laboratories. of study, in the period of the investigation, for a total of 37 workers.

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In relation to the inclusion criterion, it was considered to be a laboratory worker, accept to work in the research and the exclusion criterion, students in training or personnel in service provision. The information collection instrument was the questionnaire, which contains 6 elements to be evaluated related to training in biosafety (Annex 1). The variables considered, age, sex, years of work. The variables were worked with an analytical evaluation in which percentages, mean, standard deviation were considered.

RESULTS

The most relevant data of the study are shown below: in relation to the sociodemographic characterization:

37 workers were surveyed. The gender distribution of the study population corresponded to 35 women (94.5%) and 2 men (5.4%). The age range oscillated between 21 and 64 years, the length of service varied from 1 to 38 years, with a mean of 12 years, as shown in Table 1.

Table 1. Demographic characteristics of the sample.

| Variables | Minimum | Maximum | Mean±SD |
|----------------------|---------|---------|---------|
| Age (years) | 21 | 64 | 39 ±12 |
| Working time (years) | 1 | 38 | 12± 11 |
| Gender: male/female | - | - | 2/35 |

SD: Standard deviation. n=37

Source: Applied survey

Table 2 shows that 45.9% of the workers had not received training in biosafety, according to the interview conducted (Annex 1). The three polyclinics show a similar training pattern ($\chi^2=2.269$, $p=0.322$). Only 5.4% received the basic Biosafety course; in the 3 polyclinics, the most frequent type of training was incidental orientation on biosafety.

Table 2. Training received on biosafety

| Received Courses | A | | B | | C | | Total | % |
|---|----|------|----|------|----|------|-------|------|
| | N | % | N | % | N | % | | |
| Basic Biosafety Course | 1 | 9,0 | - | - | 1 | 7,6 | 2 | 5,4 |
| Biosafety as part of the preparatory school to fulfill an internationalist mission. | - | - | 2 | 15,3 | 2 | 15,3 | 4 | 10,8 |
| Interrelated courses with biosafety. | 2 | 18,2 | - | - | - | - | 2 | 5,4 |
| Incidental guidance on biosafety. | 6 | 54,4 | 5 | 38,4 | 3 | 23,0 | 14 | 37,8 |
| They received no training. | 3 | 27,2 | 7 | 53,8 | 7 | 53,8 | 17 | 45,9 |
| Total | 11 | 29,7 | 13 | 35,1 | 13 | 35,1 | 37 | 100 |

Source: Applied interview

As shown in figure 1, 20 received training and 55% considered the training received as sufficient (in 3 cases above expectations), 35% considered the training received as insufficient.

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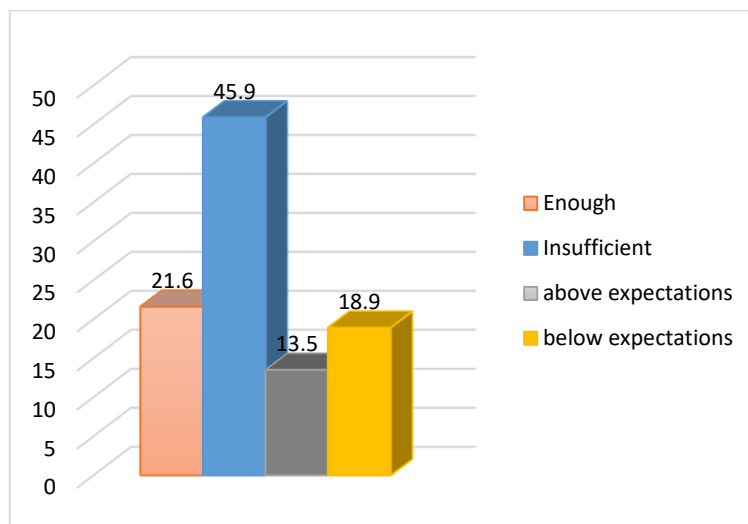


Figure 1. Criteria on the training received before the intervention

The applied questionnaire made it possible to identify both the degree of training and knowledge of the risk of exposure, and a low level of knowledge of the risks was found, 100% identified biological risk as the most important and 2.7% (1) identified chemical risks as present in daily work practice.

On the other hand, 16.2% correctly defined the concept of biological safety.

After the evaluation of the training deficiencies of the laboratory personnel of the three centers, a training intervention was carried out

(Annex 2), which was considered sufficient by 100% of those surveyed and in 89.2% it was above expectations, as shown in Figure 2.

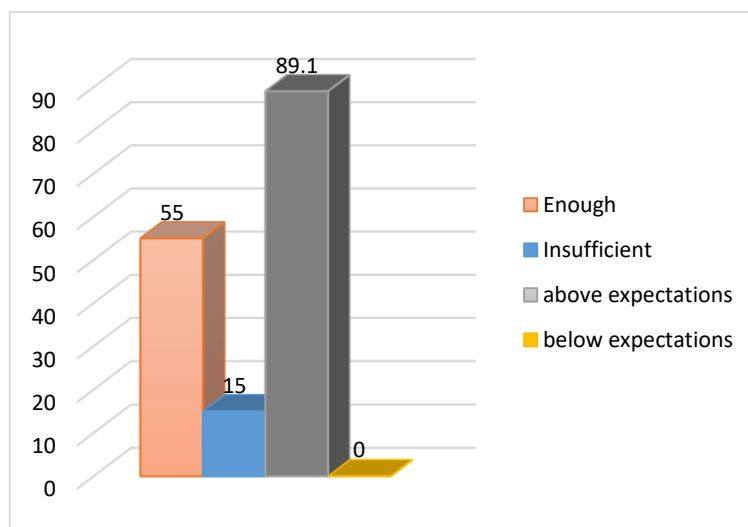


Figure 2. Criteria after the training intervention

DISCUSSION

The present investigation was carried out with 37 workers from three clinical laboratories in the municipalities, Plaza de la Revolución, San Miguel del Padrón and Boyeros, between the ages of 21 and 64, where the female sex predominated for 94.5%. To whom an interview guide was applied to assess the knowledge they have about biosafety and their assessment regarding the training received.

It was found in the study that 45.9% of the sample did not receive training on biosafety and valued it as insufficient, 45.9%, 21.6% as sufficient, 18.9% of the studied sample categorized it as below their expectations and 13.5% above their expectations.

The results of the present investigation differ from those found in the study carried out on professional laboratory workers in the city of Jaén, Colombia, in which it was found that 64.28% of the respondents had high levels of knowledge of safety regulations. (6) They also differ from the results published in the research entitled level of knowledge of biosafety standards by the healthcare personnel of the IPS Clínica San Rafael Fundación Universitaria del Área Andina in 2017, in which it was shown that close to the total of the surveyed population obtained a high level of knowledge about Biosafety (7), they also differ from the results published

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by Rodríguez and Argote who found that 42% of the sample of their study did not receive training but showed a level of knowledge regarding the risk of exposition. (8)

The results show gaps in learning in Biosafety, a discipline that encompasses a series of patterns that allow clinical laboratory personnel to work in safe conditions, in addition to preventing exposure to pathogens.

In addition to the difficulties identified in terms of training in polyclinics A, B and C, the applied survey revealed a low level of knowledge of the risks, 100% identified biological risk as the most important before the educational intervention.

Similar results were found in four investigations in the first and the second, a low perception of risk was determined, since they do not value the risk to which the workers are exposed, they become familiar with the activities with biological risk that they carry out daily and are prone to make mistakes (9,10); the third investigation found a low level of knowledge of occupational risk and the last investigation found that only 12% of the personnel consulted identified biological risk and placed it in the priority position that a facility deserves whose work environment involves the manipulation of biological agents or samples that can potentially contain them. (eleven).

Training is essential for the development of a healthy work environment, therefore it is important to provide adequate training that influences the knowledge that workers must have regarding the risks to which they are exposed, since whoever does not perceive the risk does not assume a constructive position of confrontation. (12)

The occupational risks to which the clinical laboratory personnel are exposed increase with the performance of their activities, so that during their professional training knowledge, critical judgment, development of abilities and skills in the performance of their functions are required. (13)

After the evaluation of the deficiencies in the training of the laboratory personnel of the 3 centers, a training intervention was carried out (Annex 2) with a program of 15 1/2 hours (8 weeks) at a rate of 1 to 2 hours per day. , with a weekly frequency (Friday) after completion, the same instrument was applied in order to evaluate the training received and it was found that the level of knowledge was considered sufficient by 100% of the respondents and in 89.2% It was above expectations.

When comparing the results obtained after the training intervention, we found similar results in three investigations entitled, Application of an educational program on biosafety in Microbiology laboratories. Bayamo. Granma, educational intervention on biosafety in health workers and educational intervention to increase knowledge about biosafety in the nursing staff of a hospital institution in which it was found that the knowledge about biosafety of workers increased ostensibly after the training intervention considering it effective. (13, 14,15)

CONCLUSIONS

Deficiencies in knowledge about biosafety were identified that were reversed with a training intervention that was considered sufficient by 100% of the respondents, for which it is considered effective.

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Annex 1. Training received

Dear colleagues, the following questionnaire aims to obtain information in order to contribute to the risk analysis procedure in biomedical facilities. The questionnaire aims to assess the knowledge that poor biosafety has and its assessment regarding the training received. Your opinions will be very valuable, so we expect your maximum cooperation.

Thank you very much for your support!

Miriam Virginia Valdés Fernández (International Center for Neurological Restoration)

| Questionnaire | | | |
|------------------------------|---|----|----|
| Center: | | | |
| Position of the interviewee: | | | |
| Date: | | | |
| 1 | ¿ Have you received courses on Biological Safety? | Si | No |
| 2 | ¿ What quality do the courses received have? | | |
| a | Basic Biosafety Course | | |
| b | | | |
| c | Biosafety as part of the preparatory school to fulfill an | | |
| d | internationalist mission | | |
| e | Courses Interrelated with biosafety | | |
| | Incidental Biosafety Guidance | | |
| | They received no training. | | |
| 3 | He considers that the training topics received meet his needs for self-improvement in the following ways: | | |
| a | Enough | | |
| b | Insufficient | | |

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| | |
|---|--|
| c | above expectations |
| d | below expectations |
| 4 | ¿ What do you understand by biological security? |
| 5 | What risks do you consider that the activity that you carry out involves? Biological _ Physical _ Chemical_ |
| 6 | Justify Briefly |

Annex: 2 Educational Intervention

TEACHING POLYCLINICS A, B AND C

Title: Basic Biosafety Course

Faculty that will teach the Course:

Teachers:

Miriam V. Valdes Fernandez

Number of hours taught: 15 ½ hrs.

Work Center: International Center for Neurological Restoration.

Professional Category: Bachelor of Nursing, Master in Biosafety

Teaching Category: Auxiliary

Scientific Category: Aggregate

Position held: Epidemiological Surveillance Nurse

Overall objective:

- ✓ Acquire, update, consolidate and improve knowledge and skills in the field of Biosafety.

Specific objectives:

- ✓ Update the technical, licensed and administrative personnel in biosafety.
- ✓ Incorporate current knowledge and approaches on Biosafety systems in laboratories.

Venue: Teaching Polyclinic A, B and C

Start date: March 4, 2019

Completion date: April 30, 2019

Addressed to:

Laboratory technician, graduates in health technology, workers.

| No | Theme | Time | teaching methods |
|----|--|------------|------------------------------|
| 1 | Definitions and terms | 1 1/2 hrs. | Conference. group discussion |
| 2 | Legal basis of Biosafety | 1 hrs. | Conference. group discussion |
| 3 | Good laboratory Practices | 2 hrs. | Conference. group discussion |
| 4 | Laboratory Hazards Sample | 2 hrs. | Conference. group discussion |
| 5 | Transportation Risks in facilities that handle biological agents | 2 hrs. | Conference. group discussion |
| 6 | Risks in facilities that handle biological agents | 2 hrs. | Conference. group discussion |

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| | | | |
|----|--------------------------------|--------|------------------------------|
| 7 | Biohazard Facility Design | 1 hrs. | Conference. group discussion |
| 8 | Disinfection and sterilization | 1 hrs. | Conference. group discussion |
| 9 | Security equipments | 1 hrs. | Conference. group discussion |
| 10 | Biological waste management | 2 hrs. | Conference. group discussion |

Teaching Strategy

The teaching process will be characterized by being dynamic and different forms of teaching will be used: conferences, bibliographic reviews, as well as Education at Work (ET) that includes the areas of the laboratory where the staff works in Knowledge.

Necessary resources:

Appropriate teaching aids and up-to-date bibliography are available for this task.

Organization, calendar and periodicity of the Activities:

The activity will consist of 151/2 hours (8 weeks) at a rate of 1 to 2 hours per day, with a weekly frequency (Friday)

Lectures: 151/2 hours

Forms and Means of Teaching:

Different forms of teaching were used: lectures, literature reviews.

Teaching media:

Computer