

TRAINING FOR PREVENTION RISKS CAUSED BY BIOLOGICAL AGENTS

LA CAPACITACIÓN PARA LA PREVENCIÓN DE RIESGOS POR AGENTES BIOLÓGICOS

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ABSTRACT

A healthy work environment and adequate medical care are important factors. This research proposes a training strategy aimed at preventing risks caused by biological agents. To achieve this objective, we used theoretical and empirical methods for diagnosing and identifying risks caused by biological agents in the health area in Las Coloradas Polyclinic, Moa municipality. A bibliographic and biosafety standard review as well as supplementary materials were also used to design training courses that will facilitate best practices and ensure a healthy work environment and a good medical care.

KEYWORDS: risk prevention; biological agents; health training

RESUMEN

Se elaboró una estrategia de capacitación dirigida a los trabajadores de la salud para la prevención de riesgos causados por agentes biológicos. Fueron utilizados métodos del nivel teórico y del nivel empírico que permitieron el

diagnóstico para identificar los riesgos causados por agentes biológicos en el área de salud del policlínico Las Coloradas, Moa; la búsqueda bibliográfica, la revisión de las normas de bioseguridad y los materiales complementarios para concebir los cursos de capacitación, permitirán prácticas más seguras que garanticen un ambiente de trabajo sano y una atención médica de calidad.

PALABRAS CLAVE: prevención de riesgos; agentes biológicos; capacitación en salud

INTRODUCTION

Nowadays, biological risk has transitioned from an unknown scenario to becoming part of our daily life. The continuous professional development of workers exposed to biological risks is considered a basic and necessary aspect for preventing work-related diseases in the work environment (Guerra et al., 2024).

An accident involving biological risk is defined as a percutaneous injury caused by a needle stick or cut with a sharp or piercing object; likewise, contact of mucous membranes or non-intact skin (with lesions) with blood, tissues, or other body fluids that may be potentially infectious and endanger healthcare personnel (Orozco, 2013).

The causes leading to these risks include lack of knowledge, insufficient training and information, over-reliance on technology, adoption of bad work habits, resistance to accepting rules and regulations, as well as non-compliance with safety standards and poorly planned work procedures.

An aspect to be considered is the risk assessment and its further analysis, which is a key process. This involves identifying hazards, their causes and potential consequences, and then, evaluating, controlling and communicating, being the basis for the decision-making using scientific knowledge and updated information.

Therefore, biological risk can be assessed and controlled to safeguard worker safety and health, as well as the environment. It must be considered that unforeseen accidents and poor performance by exposed personnel are the main causes of individual harm which, under certain circumstances, can extend to the hospital environment or the community, causing varying degrees of impact.

Training actions for healthcare workers are of great importance in preventing risks from biological agents. Occupational training in health area and safety work aims to provide workers with the knowledge that enables them to comply with biosafety norms and laws to prevent diseases related to t risks in their specific work positions.

During the learning process, updated contents on occupational safety can be incorporated, allowing for adaptation to the context to generate new measures and solutions benefiting occupational safety and health. It is one of the most important activities for creating a culture of occupational risk prevention, including important topics for work safety, which leads to the improvement of workers' job performance (Murillo et al., 2025).

For this reason, a factual diagnosis was carried out at "Las Coloradas" Polyclinic in Moa, based on the training needs of workers exposed to these risks. Although some actions are taken, the culture regarding risk prevention is insufficient.

The research identified the following shortcomings:

- ✓ Limited knowledge regarding aspects related to the handling of biological agents, biosafety standards, and their environmental impact when not handled properly.
- ✓ Insufficient systematization of prevention actions related to biological risks affecting health and the ecosystem.

- ✓ Poor integration of knowledge in community and ecosystem occupational health towards a culture of biological risk prevention.

In relation to the above, the following scientific problem is assumed: ¿How to contribute to strengthening the knowledge of medical professionals regarding the prevention of environmental contamination caused by biological agents?

Therefore, the research objective was determined as: to develop a training strategy on environmental contamination by biological agents aimed at medical professionals.

DEVELOPMENT

In Cuba, health is a right of all citizens and a responsibility of the State, which demands the permanent development of the training system for human resources subjected to biological risks. These workers must know and adequately practice the requirements established by the biosafety protocol and have opportunities for professional development in this area (Infante & Breijo, 2017).

In the workplace, healthcare workers must receive adequate training about jobs related dangers they face in their environment where they work, considering risks complexity and exposure caused by biological agents in the performance of their duties.

For this reason, Decree Law 190/99 set for the development of dissemination, training and education actions in this field aimed at professionals, technicians, and public health workers exposed to biological risks, encompassing safety, legislation, social communication and the proper wear/use of individual and collective safety equipment (Guerra et al., 2024).

Despite this, in certain specialties and disciplines there are knowledge and skills gaps that need to be addressed through constant staff training and development. Therefore, all strategies aimed at mitigating biological risk gain special relevance (Agudelo, 2021).

Meanwhile, (Vega & Carvajal, 2021) state that the scarce application of personal protection practices and procedures for biological risk management, the inadequate disposal of hospital wastes, and the limited knowledge of universal precautions-measures intended to reduce the risk of transmission of infectious work-related diseases thus minimizing the likelihood of exposure to blood and other body fluids.

On the other hand, the World Health Organization (2022) recognizes the workplace as a priority setting for the development of health prevention, promotion, and protection actions for worker safety and health, and considers training a key element for developing a healthy work environment (Sánchez & Pérez, 2021).

The aforementioned authors recognize the need for training to strengthen necessary knowledge for the adequate management of preventive measures to cope risks from biological agents and thus modify the behaviors that generate them. Biosafety involves not only professionals and technicians but all workers regardless of the tasks they perform.

In Cuba, worker's training is a social need set forth in Chapter 4 and Guidelines 95, 96, and 97 of the economic and social policy of the Party and the Revolution for the period 2021-2026 (Guerra et al., 2024).

In higher education, training aims at «the permanent education and systematic updating of university graduates, the improvement of their professional and academic performance, as well as the enrichment of their cultural background» (Medina & Valcárcel, 2016).

It should support the required transformations of behavior, general and specific knowledge, basic and specialized skills, habits, attitudes, values and responsibilities in their work functions.

Within the theory of Advanced Education, training is considered as that one directed at labor resources, with the purpose of updating and perfecting current and/or prospective professional performance, addressing training

deficiencies gaps, or completing knowledge and skills not previously acquired but necessary for performance. This process is developed in an organized manner, has a systemic character, and its execution generally does not lead to accreditation for performance (Castillo, 2004).

On the other hand, training responds to learning needs identified by the individual themselves or the employer, allows for exchange between managers and workers based on the participants' experiences, and favors the awareness of both managers and exposed personnel.

According to Díaz, Ramos & Santoya (2020), training is the set of actions that allows for the creation, maintenance, and enhancement of workers' knowledge, skills, and attitudes to ensure successful performance. They are aimed at prioritizing the completion of job training needs for recent graduates of higher education and technical-professional education.

Training aimed at workers in areas, where there are potential biological agents, is a tool for keeping update the protocols aimed at mitigating risks for accidents prevention and occupational diseases.

Risk prevention training must be intended to achieve safe environments in the socio-labor setting where the healthcare worker operates. Actions aimed at this risk group broaden knowledge for safety standards compliance, good work practices and achieving a healthy work environment.

Currently, biological risk has transitioned from an unknown scenario to being part of our everyday life. This was evidenced during the COVID-19 pandemic, where prevention actions were established not only in health centers but in all socio-environmental and work settings to avoid the risk of getting the disease, based on all the conceived sanitary-hygienic measures for the care of workers' health and general population.

The identification of occupational exposure allows for the proper classification of the biological agent. The most internationally used classification is the one set forth by the WHO Biosafety Manual (4th Edition), which determines the classification according to risk infection, as follows (Arriciaga & Vaca, 2010):

Group 1: unlikely to cause disease in humans.

Group 2: may cause disease in humans and pose a hazard for workers; unlikely to spread to the community; generally, effective prophylaxis or treatment exists.

Group 3: may cause severe disease in humans and is a serious hazard to workers, with a risk of spreading to the community; generally, effective prophylaxis or treatment exists.

Group 4: causes severe disease in humans and poses a serious hazard to workers; high likelihood of spreading to the community; generally, no effective prophylaxis or treatment exists.

Among the types of biological agents are viruses, bacteria, fungi, and parasites (protozoa). Based on this classification and the different types of biological agents, it is essential to design a training strategy to develop actions that allow healthcare workers to become aware of the risks they are exposed to, develop risk perception, and put safety measures into practice to prevent infection by biological agents.

Training strategy for environmental contamination by biological agents aimed at healthcare professionals

The strategy for training healthcare professionals at the «Juan Manuel Páez Inchausti» Polyclinic is presented. It is based on the presentation on the basis supporting the strategy's development, taking as references researches related to the stated problem and the researcher's experience as part of the team of professionals working in this unit. The proposal is presented and described based on its structuring into stages, as well as the activities that comprise its design and evaluation that will be developed for this purpose. A description of each stage follows:

Stage I. Diagnosis and Planning

This stage revisits the foundations of the described theoretical concept, alluding the assessment of preparedness and the place occupied by the healthcare professional regarding their current level of knowledge on topics related to the prevention of biological risk.

Specific Objectives:

To determine training needs of healthcare professionals in contents related to the prevention of biological risk and environmental contamination by these agents. To project actions that contribute to the improvement of professional preparation in primary health care aimed at the prevention of biological risk.

Actions:

- To characterize the current situation of preparation of healthcare professionals in matters of biological risk prevention and environmental contamination by these agents.

The characterization of the current situation of professional preparation should be carried out by applying diagnostic instruments. Based on the results obtained from the characterization, the contents of the professional training will be determined to reflect specific learning needs of the healthcare professionals for the improvement of their socio-labor actions. Determination of the training formats to be developed.

Objective: To determine the different formats in which the training of healthcare professionals will be developed, based on establishing adequate communication, with the social purpose of the unit as the central axis, allowing for the improvement of their work.

Knowledge System: the study of the organizational forms that allow selecting the conference, workshop and self-improvement activities as the means to achieve the strategy's objective.

Method: Joint elaboration.

Means: Textbooks, slides, and materials in digital format

Participants: All professionals in the sample.

Executor and Responsible: Trainer

Evaluation: It is important for each professional to participate and share their experiences in the activity, which will be evaluated and shared with each one at the end of the session.

- Determination of the objectives and contents in correspondence with the possibilities that each one offers for the research purposes, within the proposed training formats.

Objective: To define the objectives and contents, based on their conscious and accurate planning, in the different work sessions proposed as part of the professionals' training for the improvement of their performance.

Knowledge System: Biological risk. Its prevention. Environmental contamination by biological agents, actions to reduce it.

Method: Joint elaboration

Means: Textbooks, slides

Participants: Trainer and healthcare professionals

Executor and Responsible: Trainer

Evaluation: All presentations carried out within the framework of the activity will be evaluated, specifying their contribution to its objective.

- Determination of the systematic and final evaluations of the professionals in the different proposed training formats to contribute to the improvement of their performance.

Objective: To determine the evaluation forms that will be used in all work sessions and at the implementation completion, so that each professional knows their potential and limitations in the activities carried out, as well as the preparation achieved for their professional performance.

Knowledge System: performance evaluation as a personalized component.

Method: Joint elaboration.

Means: Textbooks, materials on digital format.

Participants: Trainer and professionals

Executor and Responsible: Trainer

Evaluation: The contribution offered by each professional should be systematically evaluated, taking into account their assessments and inputs based on the activity they perform.

Stage II: Actions Execution

On this stage, the actions are developed based on the different training formats proposed for the application of the strategy: conferences, workshops, and self-preparation activities as a way to contribute to the improvement of professionals' performance, based on the potential and limitations they show in activities related to the prevention of biological risk and environmental contamination by such agents.

First Activity. Introductory Workshop.

Objective: To make aware the participating healthcare professionals of the importance of training for the improvement their professional performance and the role they play in fulfilling the social purpose of the Polyclinic, where the prevention of environmental contamination by biological agents plays an important role.

Knowledge System:

- ✓ Importance of training for improving the work of healthcare professionals.

Method: Heuristic conversation

Means: Documentary, textbooks, slides

Participants: All professionals

Executor and Responsible: Trainer

Evaluation: Oral questions will be asked at different moments of the activity, considering the depth of the responses in each of their interventions. This will be recorded in a systematization record created for this purpose.

Procedure: This first meeting will be directed at framing the activities based on the different selected training formats, including conferences, workshops, and the development of self-improvement activities; where the professional prepares themselves to expand their knowledge, overcome their difficulties, and acquire skills as a means through which they can achieve self-transformation via the offered exercises and the recommended bibliography, all depending on the professional's profile.

In a second moment, a debate will be held, and the way in which participants will be evaluated will be determined, both systematically, based on the systematization record, and through a final evaluation based on the proposed moments of change to verify the improvement in the professionals' performance.

Second Activity:

Conference 1: Introduction to the topic of Biosafety in National Health System Institutions

Objective: To explain the importance of knowing the fundamental contents related to biosafety in National Health System institutions, as an indispensable means for the performance of healthcare professionals.

Knowledge System:

- ✓ Biological Safety as a discipline.
- ✓ Concept of biosafety, basic principles, biosafety levels, scope.
- ✓ Organization of Biological Safety in the National Health System.
- ✓ Safety management in health institutions.

Method: Joint elaboration

Means: Textbooks, slides, materials in digital format

Participants: All professionals

Executor and Responsible: Trainer

Evaluation: It will be conducted through hetero-evaluation; furthermore, the importance of theoretical and practical mastery of the developed topic for their professional performance, as an efficient means for fulfilling their social purpose, will be socialized among the participants.

Procedure: The development of a conference to address the theoretical contents related to biological safety as a discipline, the concept of biosafety, its basic principles, biosafety levels, safety management in health institutions.

During the encounter, it is significant to point out the problems that arise in a self-critical manner, which a large number of specialists in the activity manifest to have; when exchange and reflection on the matter occur, they place the topic as an indispensable part of their daily work.

Third Activity.

Conference 2: Evaluation of Biological Risk in Health Institutions

Objective: To argue the importance of healthcare workers knowing about the existence of biological risk, the different biological agents that can be identified in their workplace.

Knowledge System:

- ✓ Risks related to health institutions.
- ✓ Generalities.
- ✓ Classification of risk areas.
- ✓ Types and characteristics of occupational risks in patient care.
- ✓ Evaluation of biological risk in health institutions.
- ✓ Definitions: biological risk and biological agents.

Method: Joint elaboration

Means: Textbooks, materials in digital format

Participants: All professionals in the sample

Executor and Responsible: Trainer

Evaluation: Oral questions will be asked at different moments of the activity, considering the depth of the responses in each of the interventions by the professionals, as well as the worker's profile. This will be recorded in a systematization record created for this purpose.

Fourth Activity

Workshop 1: Healthcare-Associated Infections.

Objective: To identify the different groups of biological agents, as well as the exposure mechanisms and routes of entry.

Knowledge System:

- ✓ Prevention and control of healthcare-associated infections.
- ✓ Healthcare-associated infections (HAIs).
- ✓ Historical evolution.

- ✓ Definition.
- ✓ Classification.
- ✓ Epidemiology of HAIs.
- ✓ Morbidity. Mortality.
- ✓ Costs.
- ✓ Epidemiological chain of transmission and risk factors related to HAIs.
- ✓ Principles and practices for the prevention of HAIs.
- ✓ Prevention program and epidemiological surveillance system for HAIs.
- ✓ Most common biological agents in health institutions.

Method: Debate

Means: Tablet, slides, materials in digital format, poster Participants: All professionals in the sample.

Executor and Responsible: Trainer.

Evaluation: Oral questions will be asked at different moments of the activity, considering the depth of the responses in each of the interventions by the specialists. This will be recorded in a systematization record created for this purpose.

Procedure: A pleasant, deep, and contextualized analysis of the different occupational diseases that a worker can acquire due to improper handling of hazardous waste should be carried out.

The creation of communicative situations must be guaranteed, based on the realities reflected by the author, the proposal of solutions elaborated by the professionals to face the reality of the process at the Juan Manuel Páez Polyclinic.

In the conclusions of the debate, ideas that are of great value for verifying the involvement of the participants should be highlighted, taking as a reference those expressed by the specialists who initially show more resistance to change.

Stage III. Evaluation

Throughout the development of the strategy, the proposed moments of change will be evaluated to verify the degree of transformation in the knowledge and skills achieved by the healthcare professionals of the «Juan Manuel Pérez Inchausti» Teaching Care Polyclinic in Moa.

This evaluation will be conceived both, as a process and as a result of the actions proposed for the different stages, in which the healthcare professionals will participate.

Healthcare professionals, wherever they perform their daily work, need preparation to minimize all complications deriving from limited knowledge of biological risk prevention.

The strategy is a practical contribution that allows overcoming the limitations that healthcare professionals currently present regarding the prevention of biological risk, which allows for better development and safety in the activities they perform at the "Juan M Pérez Inchausti" Polyclinic.

CONCLUSIONS

The proposal assumes an integrated character in the educational teaching process as a learning process, aimed at a preventing culture to protect the workers health and safety. It provides the necessary knowledge for identifying the risks they are exposed to and for developing safer practices that guarantee a healthy work environment and quality medical care.

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