

A critical analysis of biosafety regulation implementation in various settings

Análise crítica da aplicação das normas de biossegurança em diferentes cenários

Valéria Cristina de Faria¹, Luciana Moreira Lima²

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ABSTRACT

Introduction: Biosafety is the study and procedures that aim to avoid or control the risks created by the use of chemical, physical, and biological agents, which makes it a core teaching component for medical students. **Objective:** to evaluate whether the practical component on biosafety taught in the Laboratory Applied to Clinical Practice I course was an effective teaching strategy and whether it was considered so by students. **Methods:** 53 Medicine students at the Universidade Federal de Viçosa enrolled in the Laboratory Applied to Clinical Practice I course were split into four groups (G). They visited and analyzed the use of biosafety in different settings in the city of Viçosa/MG: G1 as assigned to the Clinical Laboratory at the Hospital São Sebastião, G2 to the Clinical Analyses Laboratory at the UFV Health Department, G3 to the Emergency Department at the Hospital São João Batista, and G4 to the Health Division. Each group had to present a report and a seminar with their observations and answer an assessment questionnaire about the fieldwork. **Results:** groups performed the tasks appropriately and G3 stood out because they were invited to lecture on the theme. Questionnaire responses were positive in relation to the chosen teaching strategy. **Conclusion:** this fieldwork was crucial in complementing students' knowledge on biosafety and seems to have been a motivating learning tool for them.

Key words: Exposure to Biological Agents; Education, Medical; Students, Medical; Teaching/methods; Education/methods.

¹ Master's student in Physical Education, REUNI Scholarship student. Universidade Federal de Viçosa – UFV, Viçosa, MG – Brazil.

² Adjunct Professor, Department of Medicine and Nursing, UFV, Viçosa, MG – Brazil.

RESUMO

Introdução: biossegurança é o conjunto de estudos e procedimentos que visam evitar ou controlar riscos provocados pelo uso de agentes químicos, físicos e biológicos, o que torna fundamental o seu ensinamento aos estudantes de Medicina. **Objetivos:** avaliar se o trabalho prático de biossegurança oferecido na disciplina Laboratório Aplicado à Clínica I foi uma estratégia de ensino favorável e, ainda, se na visão dos alunos foi uma ferramenta positiva. **Métodos:** 53 alunos de Medicina da UFV matriculados na disciplina Laboratório Aplicado a Clínica I foram divididos em quatro grupos (G) para visitar e analisar a aplicação da biossegurança em diferentes locais na cidade de Viçosa/MG: G1 – Laboratório Clínico do Hospital São Sebastião; G2 – Laboratório de Análises Clínicas da Divisão de Saúde da UFV; G3 – Pronto-Socorro do Hospital São João Batista; G4 – Divisão de Saúde. Cada grupo deveria apresentar um relatório e um seminário com suas observações e responder o questionário de avaliação do trabalho prático. **Resultados:** os grupos cumpriram as tarefas de maneira satisfatória, o G3 se destacou por ser convidado a realizar uma palestra sobre a temática. As respostas do questionário foram positivas em relação à estratégia de ensino adotada. **Conclusão:** este trabalho prático foi fundamental para complementar o conhecimento sobre biossegurança, pois parece ter sido ferramenta de ensino motivadora para os alunos.

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Institution:

Department of Medicine and Nursing,
Universidade Federal de Viçosa
Viçosa, MG – Brazil

Corresponding Author:

Luciana Moreira Lima
E-mail: luciana.lima@ufv.br

Palavras-chave: Exposição a Agentes Biológicos; Educação Médica; Estudantes de Medicina; Ensino/métodos; Educação/métodos.

INTRODUCTION

Biosafety permeates the most diverse professions because it comprises the studies and procedures aimed at preventing or controlling the risks caused by use of chemical, physical, and biological agents to biodiversity, which makes awareness of it essential.^{1,2} This knowledge is, therefore, very important to various healthcare professionals, in particular those working in laboratories and hospital areas, although it appears to be lacking in some higher education courses.^{1,3}

In opposition to the abyss mentioned by Costa e Costa⁴ between the magnitude of the problem and the education and training of human resources in biosafety, this theme is taught to medical students at the Universidade Federal de Viçosa as part of the syllabus in Laboratory Applied to Clinical Practice I (MED 131), in the first semester of their undergraduate degree. The theme is approached briefly, however, on account of the total workload, and includes the following: introduction to laboratory work; physical, chemical, ergonomic and biological hazards; basic biosafety techniques; personal and collective protective equipment (PPE and CPE); risk maps, and hand washing.

In order to ensure this important subject in a doctor's routine is properly learned, the MED 131 course proposes some practical work as a teaching strategy so that students have the opportunity to critically observe different health care environments and to discuss among themselves how the theoretical knowledge learned apply to these real scenarios, since total obedience to biosafety rules is virtually impossible.⁵

There are few studies on educational practices regarding biosafety⁶ and doing practical work on the topic early in the medical education could help develop a critical-reflexive stance about that will be their working environment.⁶ It could also be instrumental in reducing the occupational risks of exposure to biological material they will be subject to throughout their degree⁷, enabling them to develop self-protection measures.⁸ Furthermore, the practical teaching activities seem to be important means to solidify knowledge, especially if implemented at an early stage and jointly with the theory.⁹

The aim of this study was to assess whether the biosafety practical work offered in the MED 131 course was a teaching strategy that facilitated understanding and consolidating this knowledge and, still, whether students saw it as a positive tool.

MATERIAL AND METHODS

To perform the study, 53 students enrolled in MED 131 were divided into four groups (G), to visit four different scenarios: 1. G1: 14 students who visited the Clinical Laboratory of Hospital São Sebastião; G2: 12 students who visited the Clinical Analysis Laboratory of the UFV Health Division; G3: 14 students who visited the emergency room of Hospital São João Batista; G4: 15 students who visited the UFV Health Division.

Authorization to carry out the work was obtained from those in charge of each one of the places visited.

The groups had to present a seminar with their comments, criticism, and suggestions, which should be included in a printed report to be submitted those in charge of each site. Students also answered a questionnaire as part of the final assessment of the work (Table 1), to evaluate it as a teaching tool.

Table 1 - Final evaluation of the practical work on Biosafety

1 – How do you evaluate the proposal for practical work on biosafety?				
<input type="checkbox"/> Excellent	<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Bad
2 – How do you evaluate the group work?				
<input type="checkbox"/> Excellent	<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Bad
3 – How do you evaluate the seminar and report required for completing assignment?				
<input type="checkbox"/> Excellent	<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Bad
4 – In your opinion, did the assignment make you appreciate the importance of biosafety in healthcare environments more fully?				
<input type="checkbox"/> Excellent	<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Bad
5 – In your opinion, did this assignment help your professional training?				
<input type="checkbox"/> Excellent	<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Bad

RESULTS

The groups were able to do the visits but with regard to the time they spent there and accessibility to healthcare environments, their experiences were different.

G1 encountered difficulties to carry out the work because they were unable to attend the first scheduled visit due to some unexpected incidents in the hospital, which demanded another three days to carry out the activities.

G2 and G4 did not encounter difficulties to do the visits as the Health Division is already used to receiving medical students for practical classes.

G3 was very successful in its activity as, besides completing their task in only one visit, it won the respect and recognition of Hospital São João Batista and was asked to hold a lecture on the subject to its employees, which took place in 2011.

With regard to the seminars and reports presented, all groups used a camera, with permission of those in charge of the visit sites, in order to illustrate the important points observed concerning biosafety rules. The students asked several questions to the person conducting the visit, taking the opportunity to address doubts that persisted after the theoretical exposition in the classroom.

Finally, after completing these tasks, 36 of the 53 students answered a final evaluation questionnaire (Graphs 1 to 5). Answering it was optional, and students were instructed not to identify themselves. The questions were direct and with multiple-choice questions so as to motivate the students to answer and to encourage them to be honest.

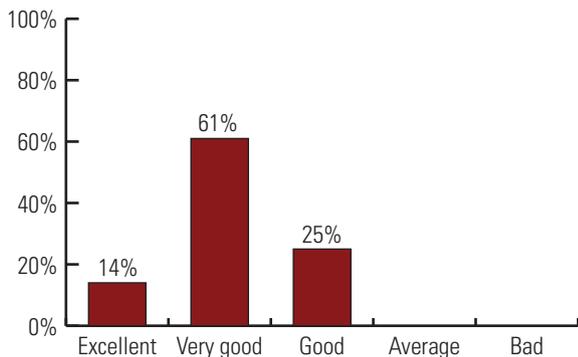


Figure 1 - How do you evaluate the proposal for practical work on biosafety?

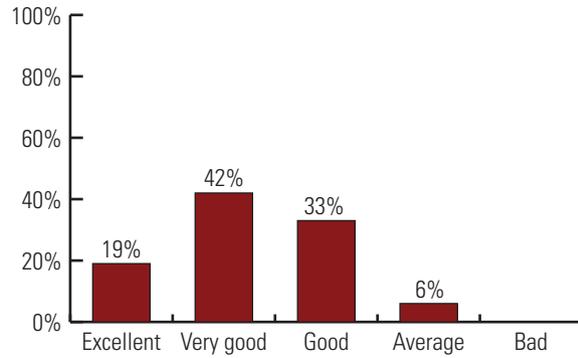


Figure 2 - How do you evaluate the work group?

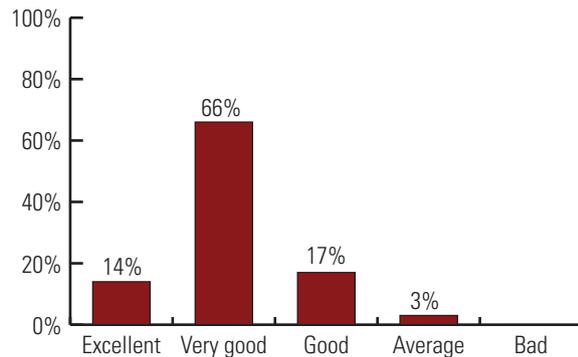


Figure 3 - How do you evaluate the seminar and report required for completing assignment?

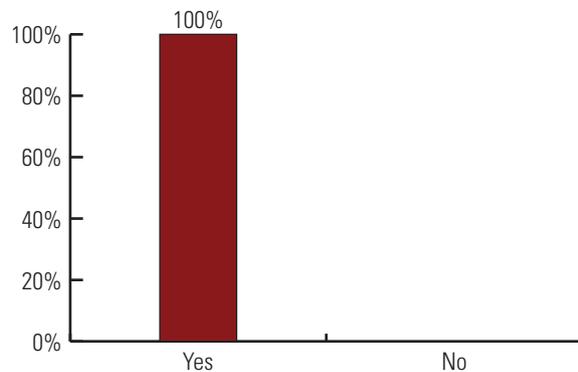


Figure 4 - In your opinion, did the assignment make you appreciate the importance of biosafety in healthcare environments more fully?

DISCUSSION

This study evaluated the effectiveness of practical work on biosafety in consolidating knowledge and the students' point of view concerning the newly adopted dynamics. According to the findings, this teaching strategy was efficient and well accepted in these terms.

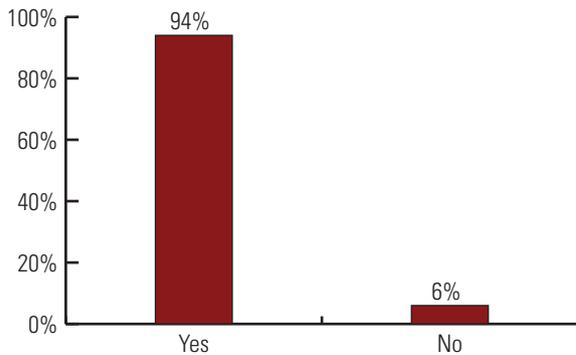


Figure 5 - In your opinion, did this assignment help your professional training?

It was possible to conclude from the seminars and reports that there is no complete compliance with biosafety standards in all visited places, which corroborates Neves's findings.⁵ However, this is not due to unawareness of those in charge, but because there are limitations, whether of financial nature or of physical space, which often require some adaptations, for instance, using plastic bottles as waste containers for sharp objects.

Some feasible suggestions were made by the students themselves and presented to the people in charge of each sector, such as making a risk assessment map of the places that did not have one. In this way, contrary to what usually happens, the map could be made by the workers with a specialist in the area, which would increase their involvement and awareness.¹⁰

This study used a brief questionnaire as a tool for student evaluation, as in the study by Costa e Costa,¹¹ which used a questionnaire to analyze the faculty' and students' perceptions of biosafety-related teaching-learning processes.

From the distribution of answers shown in Figures 1, 3 and 4, it can be noticed, respectively, that the practical work proposal was generally considered positive by students; that the seminar task and report made the knowledge consolidation easier since the groups took time to discuss their findings; and that experiencing the reality of healthcare environments made the students duly appreciate such an essential and contemporary topic to their education as well as the fact that they will be involved in the actions of quality management in the health services.³

The biggest response variation shown in Figure 2 can be understood in terms of the risks inherent to the group work method, such as lack of group discussion, lack of interest among certain students and unwillingness to deal with different opinions.¹¹

As Figure 5 shows, only 6% of the 36 students who answered the questionnaire thought that the practical work did not contribute to their professional formation. Despite not being a significant figure, this response is worrying, given that the knowledge of biosafety will influence the students' and, eventually, the doctors' conduct in risk situations. However, as mentioned in the study conducted in the Universidade Federal de Juiz de Fora/MG, practice learning activities such as the one adopted in this study can lead to increased student commitment and responsibility.

CONCLUSION

This practical work was essential to complement the knowledge about biosafety, leading students to observe critically the application of theory in practical reality. It seems to be an excellent teaching tool as regards motivation and the exchange of knowledge within and among groups, making them reflect on the theoretical issues they learned and apply them.

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