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EXPERIENCE REPORT

Biosafety course to combat the COVID-19 pandemic: An experience report

Curso de biossegurança para o enfrentamento da pandemia da COVID-19: relato de experiência

Curso de bioseguridad para combatir la pandemia COVID-19: relato de experiencia

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ABSTRACT

Objective: To report the experience of offering online and in-person courses on biosafety in combating COVID-19. **Development:** The course was a strategy developed by researchers to operationalize knowledge translation from the research study entitled "*Uso de equipamentos de proteção individual pelos profissionais de saúde no combate a COVID-19*" (Personal Protective Equipment use among health professionals in the combat against COVID-19). The content was divided into three modules: 1) Biosafety, 2) Types of precautions and Personal Protective Equipment, and 3) Good practices in health services. The online course was self-instructional, lasting a total of 15 hours and certifying 215 health professionals in Module 1, 208 in Module 2, and 205 in Module 3. In the in-person course, 82 people participated in the content taught across three modules: a lecture-discussion with a course load of either four or eight hours, which included hand hygiene practice and Personal Protective Equipment donning and doffing. **Conclusion:** TPproviding training activities based on scientific evidence favored updating the participants' knowledge on biosafety.

DESCRIPTORS:
Trainig Activities; Biosafety; Personal Protective Equipment; Pandemic; Knowledge Translation.

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RESUMO
Objetivo: Relatar a experiência da oferta de curso *online* e presencial sobre biossegurança no enfrentamento à COVID-19. **Desenvolvimento:** O curso foi uma estratégia dos pesquisadores para operacionalizar a translação do conhecimento da pesquisa "Uso de equipamentos de proteção individual pelos profissionais de saúde no combate à COVID-19". O conteúdo elaborado em três módulos: 1) Biossegurança, 2) Tipos de precaução e Equipamento de Proteção Individual e 3) Boas práticas no serviço de saúde. O curso *online* foi autoinstrucional, com carga horária total de 15 horas sendo certificados 215 profissionais de saúde no primeiro módulo, 208 no módulo 2 e 205 no módulo 3. No presencial, 82 pessoas participaram do conteúdo ministrado em três módulos: aula expositiva-dialogada com carga horária de quatro ou de oito horas, a qual incluiu a prática de higienização das mãos, paramentação e desparamentação. **Conclusão:** A oferta das atividades de capacitação baseadas em evidências científicas favoreceu a atualização do conhecimento dos participantes sobre biossegurança.

DESCRITORES:
Atividades de Capacitação; Biossegurança; Equipamentos de Proteção Individual; Pandemia; Translação de Conhecimento.

RESUMEN
Objetivo: Reportar la experiencia de ofrecer cursos en línea y presenciales sobre bioseguridad en la lucha contra el COVID-19. **Desarrollo:** El curso fue una estrategia de los investigadores para operacionalizar la traducción de conocimientos de la investigación "Uso de equipos de protección personal por profesionales de la salud en la lucha contra el COVID-19". El contenido está elaborado en tres módulos: 1) Bioseguridad, 2) Tipos de precauciones y EPP 3) Buenas prácticas en el servicio de salud. El curso en línea fue autoinstructivo, con una carga horaria total de 15 horas y se certificaron 215 profesionales de la salud en el módulo 1, 208 en el módulo 2 y 205 en el módulo 3. En el presencial participaron 82 personas, el contenido se impartió en tres módulos: clase expositiva-dialógica de cuatro u ocho horas, que incluyó la práctica de higiene de manos, colocación y retirada de equipos de protección personal. **Conclusión:** Ofrecer actividades de capacitación basadas en evidencia científica favoreció la actualización de conocimientos sobre bioseguridad de los participantes.

DESCRIPTORES:
Actividades de Capacitación; Bioseguridad; Equipo de Protección Personal; Pandemia; Traducción de Conocimientos.

INTRODUCTION

The COVID-19 pandemic impacted all sectors of society[1] and, to address it, it was necessary to implement individual and collective behavioral changes[2]. In view of this, the work process in health services had to be reorganized, highlighting the need to guarantee professional safety and protection[1] and highlighting the relevance of adherence to personal protective equipment (PPE) and its correct use by professionals [3] to prevent healthcare-associated infections (HAIs)[4].

Although healthcare professionals are more likely to get sick from COVID-19 [5] than the general populationl[6] due to direct contact with suspected and confirmed cases and exposure to aerosol-generating procedures[7], the literature shows that there are weaknesses in the proper use of PPE[3-8], as well as in the donning and doffing of personal protective equipment[9-10].These situations create insecurity for professionals in the provision of services[3], not only during the pandemic, but also in the care of patients with other infectious diseases[11].

Therefore, training activities on the adoption and proper use of PPE are essential[9,12] to ensure its protective function[11]. However, studies report that, to combat COVID-19, healthcare professionals received insufficient training activities[13]. In light of this scenario, it is important to highlight that, concerning Brazilian health services, Regulatory Standard 32 establishes basic guidelines for implementing measures to protect the safety and health of workers and recommends that the employer ensure that training activities are carried out for each risk situation faced[14].

Biosafety measures encompass a set of actions that aim to prevent, control, reduce, or eliminate risks inherent to work activities [14]. Therefore, good health practices guarantee safety for patients and professionals who are routinely exposed to risks related to healthcare (5-9). This article aims to report the experience of offering an online and in-person course on the topic of biosafety to combat the COVID-19 pandemic.

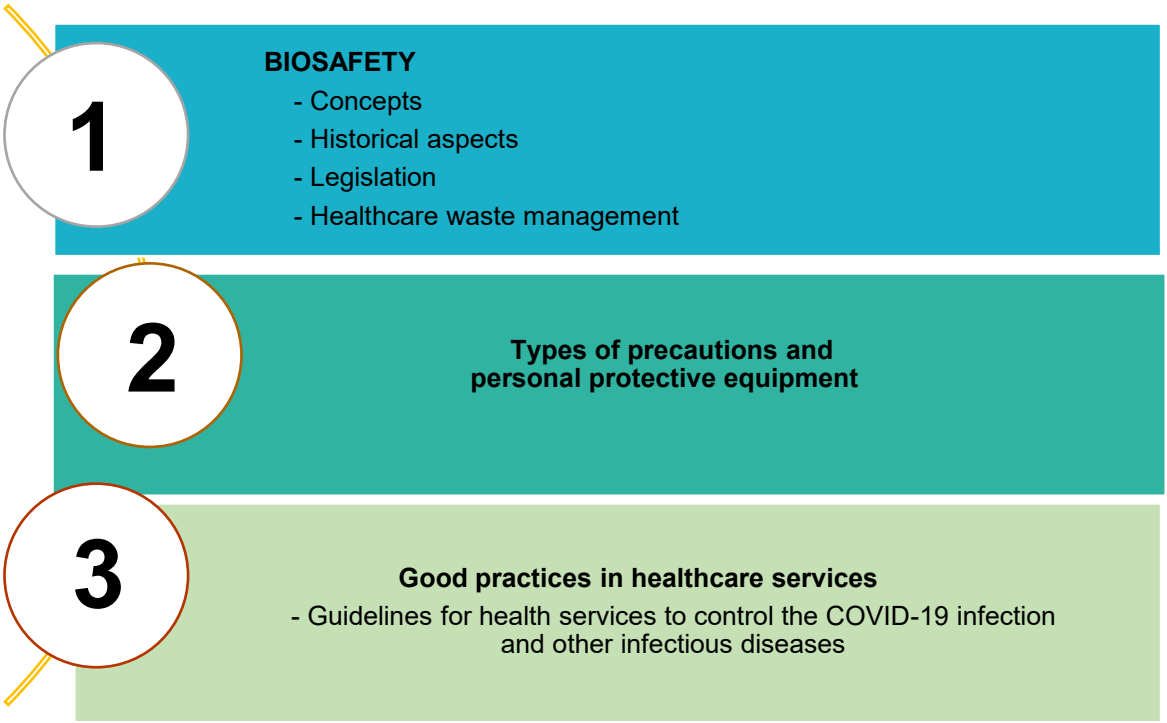
DEVELOPMENT

This is an experience report on the development and delivery of the course "*Biossegurança: boas práticas em saúde frente a COVID-19*" (Biosafety: good health practices in the face of COVID-19) in online and in-person formats. The course offering was a strategy adopted by researchers to operationalize the translation of knowledge from the "E.P.I.COVID-19 Brasil" research to provide professionals with knowledge for updated decision-making[15]. In the meantime, the provision of training through courses enables a continuous contribution to professional safety with the aim of reducing risks in the work environment[9,10-14] and providing adherence to PPE as a preventive measure for HAIs[14].

Course development

The course was designed by researchers from the research group of the Center for Studies in Infections and Complications Related to Healthcare (*Núcleo de Estudos em Infecções e Complicações Relacionadas a Assistência à Saúde*, NEICAS) and the stricto sensu postgraduate programs in nursing at the Federal University of Juiz de Fora and the Federal University of São João del-Rei. It is noteworthy that research groups in Brazil are responsible for both the production of excellent knowledge by conducting research based on gaps in health knowledge[16] and by carrying out university extension activities[17]. The three theoretical modules were prepared with updated guidelines after a broad review of national and international literature on the subject and are presented in Figure 1.

Figure 1. Modules of the course "*Biossegurança: boas práticas em saúde frente a COVID-19*" (2020).



Course offered online

The online course ENTITLED "*Biossegurança: boas práticas em saúde frente a COVID-19*" began in December 2020 - a period in which data collection for the "E.P.I.COVID-19 Brasil" survey was still taking place, and is still available for completion via the link:

https://docs.google.com/forms/d/1wSOArPYwHlFXdxeNfB6_b956rv7sf8Cb8R32dvaDdLs/viewform?edit_requested=true.

All research participants (healthcare workers working in primary health care services and professionals linked to health residency programs) were invited to take the course, which was made available in a virtual environment[18]. However, access to the course was not necessarily linked to participation in the research. Thus, anyone interested in receiving training could access the course, and upon completion of the course load, a certificate was issued.

The self-instructional content was made available through texts, videos, and slides. The use of remote technologies provides ease of use and dissemination of knowledge promptly due to the high demand for such information to combat COVID-19[19], especially during the period when social distancing was recommended.

The total course load was 15 hours, with five hours allocated to each module. From December 2020 to May 2023, 215 healthcare professionals completed module 1, 208 completed module 2, and 205 completed module 3.

Course offered in-person

With the resumption of in-person teaching activities in undergraduate and postgraduate courses, the NEICAS research team offered the course in the in-person format, as shown in Chart 1, with a course load of four or eight hours, starting from the problematization of the health work process to transform professional practices[20].

Chart 1. Characterization of the course "*Biossegurança: boas práticas em saúde frente a COVID-19*" offered in-person (2023).

Target audience	Participants	Course load
Nursing Students at the Federal University of São João del-Rei	11	4 hours
Nursing Students at the Federal University of Juiz de Fora	14	4 hours
Professionals linked to the Residency Programs of the University Hospital of the Federal University of Juiz de Fora	43	8 hours
Healthcare professionals at the Surgical Intensive Care Center of the University Hospital of the Federal University of Juiz de Fora	14	4 hours

The initial approach of the participants in the in-person course was based on investigating their prior knowledge of biosafety. Among the residents, there were participants from different areas, namely: administration, physical education, nursing, physical therapy, nutrition, dentistry, psychology, and social work. It is worth noting the report of some health residents regarding the lack of coverage of the topic in undergraduate training. Thus, it highlights the need for a curricular review to include biosafety in all health programs, given that the pandemic has highlighted the need for broad knowledge and application of this knowledge in daily work across different professional categories.

In addition to the interactive presentation of the content of the modules shown in Figure 1, there was practice in hand hygiene, donning, and doffing of personal protective equipment, since studies have shown that simulations involving training activities for donning and doffing of personal protective equipment in the context of COVID-19 are more effective in clinical practice[21].

At the end of the course, participants completed an evaluation. They highlighted the relevance of the topic to professional practice, as well as a positive perception of the teaching strategy adopted. The experience reported in this article corroborates the evidence in the literature that conducting in-person

training activities for healthcare professionals provides a bridge between theoretical and practical training, as well as professional development, enabling greater effectiveness and problem-solving capacity in healthcare services [8].

Study Limitations

The course was offered online and was self-instructional.

Contributions to the Field of Nursing, Health, or Public Policy

The study contributes to the need to offer courses focused on the topic of biosafety during the training process and in daily work.

CONCLUSION

The training activities carried out by the "E.P.I.COVID-19 Brasil" research team provided participants with knowledge on the topic of biosafety, stimulating critical and conscious thinking regarding the importance, adherence, and proper use of PPE, ensuring that good practices are incorporated into their daily work to guarantee the safety of workers and users, as well as qualifying the assistance provided.

REFERENCES

1. Emanuel EJ, Persad G, Upshur R, Thome B, Parker M, Glickman A et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. N Engl J Med. [Internet]. 2020; 382:2049-2055. Available from: https://doi.org/10.1056/NEJMsb2005114

2. Vedovato TG, Andrade CB, Santos DL, Bitencourt SM, Almeida LPD, Sampaio JFDS. Health workers and COVID-19: flailing working conditions?. Rev Bras Saude Ocup. [Internet] 2021;46:e1. Available from: https://doi.org/10.1590/2317-6369000028520

3. Assis CCG, Dutra HS, Laurindo CR, Carbogim FC, Lanza FM, Coelho ACO.Covid-19: factors associated with the use and adherence of personal protective equipment in Brazil among residents. Rev. Pesqui. (Univ. Fed. Estado Rio J., *Online*) [Internet]. 2024; 16:e-13058. Available from: https://doi.org/10.9789/2175-5361.rpcfo.v16.13058

4. Lopes M, Lima TS, Oliveira ADS, Amorim FCM, Sousa KHJF, Figueiró RFS, et al. Nursing students' knowledge and compliance with standard precautions. Acta Paul Enferm. [Internet]. 2023;36:eAPE01371. Available from: https://doi.org/10.37689/acta-ape/2023AO01371

5. Pereira AB, Rodrigues KA, Laurindo CR, Lanza FM, Dutra HS, Coelho ACO. Fatores associados ao diagnóstico por COVID-19 dos trabalhadores da Atenção Primária à Saúde no Brasil. CLCS [Internet]. 2023; 16(11): 26938–54. Available from: https://doi.org/10.55905/revconv.16n.11-131

6. Barroso BIL, Souza MBCA, Bregalda MM, Lancman S, Costa VBB. Worker health in COVID-19 times: reflections on health, safety, and occupational therapy. Cad Bras Ter Ocup [Internet]. 2020;28(3):1093–102. Available from: https://doi.org/10.4322/2526-8910.ctoARF2091

7. Kishk RM, Nemr N, Aly HM, Soliman NH, Hagras AM, Ahmed AAA et al. Assessment of potential risk factors for coronavirus disease-19 (COVID-19) among health care workers. J. Infect. Public Health. [Internet]. 2021;14(10):1313-1319. Available from: https://doi.org/10.1016/j.jiph.2021.07.004

8. Silva LS, Machado EL, Oliveira HN de, Ribeiro AP. Condições de trabalho e falta de informações sobre o impacto da COVID-19 entre trabalhadores da saúde. Rev bras saúde ocup [Internet]. 2020;45:e24. Available from: http://dx.doi.org/10.1590/2317-6369000014520

9. Ashinyo ME, Dubik SD, Duti V, Amegah KE, Ashinyo A, Asare BA, et al. Infection prevention and control compliance among exposed healthcare workers in COVID-19 treatment centers in Ghana: A descriptive cross-sectional study. PLoS ONE [Internet]. 2021;16(3): e0248282. Available from: https://doi.org/10.1371/journal.pone.0248282

10. Mustafa ZU, Majeed HK, Latif S, Salman M, Hayat K, Mallhi T, et al. Adherence to Infection Prevention and Control Measures Among Health-Care Workers Serving in COVID-19 Treatment Centers in Punjab, Pakistan. Disaster Med Public Health Prep [Internet].2023;17:e298. Available from: https://doi.org/10.1017/dmp.2022.252

11. Abed Alah MTT, Abdeen S, Selim N, Tayar E, Bougmiza I. Occupational Prevention of COVID-19 Among Healthcare Workers in Primary Healthcare Settings: Compliance and Perceived Effectiveness of Personal Protective Equipment. J Patient Saf. [Internet]. 2022;18(8):747-755. Available from: https://doi.org/10.1097/pts.0000000000001004

12. Center of Disease Control and Prevention (CDC). Coronavirus Disease 2019 (COVID-19). Strategies for Optimizing the Suply – COVID-19. Atlanta; 2020. Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/general-optimization-strategies.html

13. Moura MSS, Santos e Silva RK, Mendes PM, Sousa ASJ, Carvalho Neto FJ. Knowledge and use of personal protective equipment by nursing professionals during the Covid-19 pandemic. Rev esc enferm USP [Internet]. 2021;55:e20210125. Available from: https://doi.org/10.1590/1980-220X-REEUSP-2021-0125

14. Ministério do Trabalho e Emprego (BR). Portaria de No 806, de 13 de abril de 2022. Norma regulamentadora No 32. Segurança e trabalho nos estabelecimentos de saúde, Brasília, 2022. Available from: https://www.gov.br/trabalho-e-previdencia/pt-br/composicao/orgaos-especificos/secretaria-de-trabalho/inspecao/seguranca-e-saude-no-trabalho/normas-regulamentadoras/nr-32-atualizada-2022.pdf/view

15. Rabelo-Silva ER, Mantovani VM, Saffi MAL. Knowledge translation and advances in health and nursing practices. Rev Gaúcha Enferm [Internet]. 2022;43(spe):e20220165. Rev Gaúcha Enferm. [Internet]. 2022;43(esp):e20220165. Available from: https://doi.org/10.1590/1983-1447.2022.20220165.en

16. Etafa W, Gadisa G, Jabessa S, Takele T. Healthcare workers' compliance and its potential determinants to prevent COVID-19 in public hospitals in Western Ethiopia. BMC Infect Dis [Internet]. 2021; 21:454. Available from: https://doi.org/10.1186/s12879-021-06149-w

17. Jimenez M de O, Andrade GB de, Leitzke MRL, Stoeckl BP, Sossmeier KD. A extensão e a universidade brasileira: do estatuto das universidades até a curricularização da extensão. Educ. Teoria Prática, Rio Claro. 2023;33(66):e1. Available from: https://doi.org/10.18675/1981-8106.v33.n.66.s15304

18. Pedroso GG, Ferreira ACVV, Silva CC da, Silva GAB, Lanza FM, Coelho ACO. Data collection for quantitative *online* survey in the pandemic of COVID-19: experience report. Rev Enferm UFSM [Internet] 2022;12:e13. Available from: https://doi.org/10.5902/2179769267023

19. Christensen L, Rasmussen CS, Benfield T, Franc JM. A Randomized Trial of Instructor-Led Training Versus VideoLesson in Training Health Care Providers in Proper Donning and Doffing of Personal Protective Equipment. Disater Med Public Health Prep. [Internet]; 2020;14(4): 514–520. Available from: https://doi.org/10.1017/dmp.2020.56

20. Ministério da Saúde (BR). Política Nacional de Educação Permanente em Saúde: o que se tem produzido para o seu fortalecimento? Brasília: Ministério da Saúde, 2018. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/politica_nacional_educacao_permanente_saude_fortalecimento.pdf

21. Oliveira HC, Souza LC, Leite TC, Campos JF. Protective Equipment in the coronavírus pandemic: training with Rapid Cycle Deliberate Practive. Rev Bras Enferm. [Internet]. 2020;73:e20200303. Available from: http://dx.doi.org/10.1590/0034-7167-2020-0303

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