Rolling e-learning: an educational model to support Italian healthcare professionals during the COVID-19 pandemic

Fabrizio Pregliasco[1], Maria Rosa Valetto[2], Filippo Anelli[3], Ugo Moretti[4], Nicoletta Scarpa[2], Pietro Dri[2]

[1]Department of Biomedical Sciences for Health, University of Milan, Milan, Italy; [1]IRCCS Orthopedic Institute Galeazzi, Milan, Italy; [1]ANPAS (Associazione Nazionale Pubbliche Assistenze), Italy; [2]CME Italian national provider Zadig, Milan, Italy; [3]Italian Federation of Medical Professional Associations (FNOMCeO), Rome, Italy; [4]Section of Pharmacology, Department of Diagnostics and Public Health, University of Verona, Verona, Italy

Abstract. *Background and aim:* Rolling reviews have been widely used by the scientific community during the COVID-19 pandemic to provide guidelines and identify potential treatments in such a quickly evolving emergency. Throughout the two pandemic years, we provided independent and continuously updated (rolling) e-learning courses on COVID-19 targeted to Italian healthcare professionals with the aim of increasing dissemination based on the emerging evidence. The results of this project are presented in this brief report. *Methods:* We launched five main courses on COVID-19 – with focus on treatments and vaccines – from February 2020 to December 2022. For each course, we collected and analised participation data and, via questionnaires, customer-satisfaction data on relevance, quality, efficacy and sponsor perception. *Results:* From 22 February 2020 to 31 December 2022, a total of 224,459 enrollments were registered over the five courses with 192,966 passes (86%), for which Continuing Medical Education (CME) credits were awarded. Over 94% of participants considered the contents of high quality, relevant and effective for their educational needs. The absence of sponsorship perception, 83% overall, decreased relevantly for the two courses on COVID-19 vaccines (68.3%). *Conclusions*: Italian healthcare professionals working during the pandemic overwhelmingly appreciated and valued the rolling e-learning offer aimed at widening the dissemination of the best practices on COVID-19. This educational model provides independent, evidence-based and tailored information with the undoubted advantages of time flexibility, remote participation and continuous update, all elements that make it a useful tool in a pandemic as well as in a post-pandemic era. (www.actabiomedica.it)

Key words: E-learning, Continuing medical education (CME), Education in epidemics and pandemics, COVID-19, SARS-CoV-2

Introduction

The COVID-19 pandemic has presented the medical community with several challenges. During this unprecedented and disrupting time – which demanded intense and prompt attention to respond to the global emergency – the vital need for updated and homogeneously shared information on the best practices to be applied on the field had to come to terms with social distancing and shortage of time.

When appropriately designed and evidence-based, e-learning can enhance knowledge and modify behaviours of healthcare professionals equal to or greater than residential learning (1-3).

As already shown by the previously developed TELL ME project (Transparent communication in Epidemics: Learning Lessons from experience, delivering effective Messages, providing Evidence), which was funded by the European Union Seventh Framework Programme and aimed at designing models for

improved risk communication during infectious disease crises, e-learning is potentially an important tool during a pandemic (4). In fact, over the last two years, several supranational or national institutions, e.g. the World Health Organization (WHO), the European Centre for Disease Prevention and Control (ECDC) and the Italian National Institute of Health (ISS) have relied on e-learning to train healthcare workers (5-7).

In this context, the Italian National Federation of the Associations of Doctors, Surgeons and Dentists (FNOMCeO) and the Federation of Orders of Italian Pharmacists (FOFI) provided several e-learning courses free of charge to all Italian medical doctors, dentists, nurses and pharmacists for the whole duration of the pandemic. The first continuously updated (rolling) e-learning course, titled 'COVID-19, the disease caused by the new coronavirus (SARS-CoV-2)' (8,9) was launched on 22 February 2020, immediately after the confirmation of the first case of local transmission in Italy and was concluded on 31 December 2020. In disseminating this course, it was crucial the contribution of FadInMed (https://www.fadinmed.it) (10), the e-learning platform for physicians, dentists and nurses managed by the FNOMCeO and the National Federation of Orders for Nursing Professions, which has trained more than 573,000 healthcare professionals over the last thirteen years.

From 20 May 2020 to 31 December 2021, a new e-learning course was launched, targeted to the same health professionals, titled 'Guidelines on COVID-19 treatment options', followed by the course: 'Coronavirus: what you need to know' from 10 February 2021 to 31 December 2021, which was offered to medical doctors and dentists. The last two courses included in this report focused on COVID-19 vaccines and were aimed at nurses only. The first one was titled 'All about COVID-19 vaccines' (from 10 February 2021 to 31 December 2021) and the second 'The safety of COVID-19 vaccines; principles of vaccine vigilance' (from 3 March 2022 to 31 December 2022).

Besides the five main courses listed above, we developed and provided on Saepe (www.saepe.it), another e-learning platform (11), other courses aimed to healthcare professionals, which were still pertaining to the pandemic but focused on more specific topics. Their titles were: 'Hands' hygiene: how to make it effective', 'Donning and doffing personal protective equipment, 'Long COVID' and 'Home management

and primary care of COVID patients', which are quoted here for completeness, but were not included in the reported analysis. In addition, a course in plain language titled 'The new coronavirus pandemic: a *vade mecum* for volunteers in the field' was developed in collaboration with ANPAS (Pubbliche Assistenze, Italian Associations that aid the general population, currently representing 880 associations) and made available for the Italian volunteers engaged in the COVID-19 emergency on the Formars e-learning platform (www.formars.it) (12).

In this brief report we describe the development and results of this COVID-19 educational project throughout the whole pandemic. By investigating the participants' professional profiles, the perceived quality and efficacy of the rolling educational programmes and hypothesising their potential in delivering continuously updated evidence-based clinical knowledge to health care professionals, we aim to contribute to the discussion for the development of the best practices during a pandemic.

Methods

All e-learning courses included a dossier (learning module) - developed and drawn by evidence-based and independent scientific literature - and a series of multiple-choice knowledge questions, in compliance with the guidelines of the Italian Continuing Medical Education (CME) system (13). At the end of the course, the participants were required to complete an anonymous customer satisfaction questionnaire on the relevance of the topic, the efficacy of the e-learning system and the quality of the course and were allowed to make free comments.

The courses were made available on the FadInMed (www.fadinmed.it) (10) and Saepe (www.saepe.it) (11) e-learning platforms, which are based on the open-source Moodle Learning Management System (https://moodle.org/?lang=en).

The course titled 'COVID-19, the disease caused by the new coronavirus (SARS-CoV-2)' was developed in a standard version for all healthcare professionals and a pharmacist-targeted version. The course has been updated fortnightly up to May 2020 and subsequently monthly by rolling review.

The course titled 'Guidelines on COVID-19 treatment options' aimed to offer a complete overview of all therapeutic options for the emerging disease. Initially developed as a drug formulary integrated with the outcomes of completed and ongoing trials based on drug repurposing strategy and then on an evidence-based approach, it was updated fortnightly.

The courses titled 'Coronavirus: what you need to know', 'All about COVID-19' and 'All about COVID-19 vaccines: principles of vaccine-vigilance' were updated monthly.

All courses were updated in real-time whenever relevant national/international guidance, regulatory documents or research papers were published.

The collected data were analysed using descriptive statistics through a spreadsheet application (Excel, Microsoft Windows).

Results

From 22 February 2020 to 31 December 2022, a total of 224,459 enrollments were registered over the five courses considered in this report, with 192,966 passes (86%), for which Continuing Medical Education (CME) credits were awarded. Table 1 summarises the participation data for each course, including the passing rate and the professional profiles.

All participants were required to complete an anonymous customer satisfaction questionnaire on the relevance of the topic, the efficacy of the e-learning system and the quality of the course and were allowed to make free comments. Table 2 presents customer satisfaction data for each of the five courses considered. Over 94% of participants considered the contents of high quality, relevant and effective for their

Table 1. Participation in the CME e-learning courses on COVID-19.

Courses' title	Educational offer timespan	Participants, n (% passed)	Professional profiles
'COVID-19, the disease caused by the new coronavirus (SARS-CoV-2)' course	22 February 2020-31 December 2020	70,825 (94.7)	Medical doctors, pharmacists, dentists, nurses
'Guidelines on COVID-19 treatment options' course	20 May 2020-31 December 2021	33,000 (93.9)	Medical doctors, pharmacists, dentists, nurses
'Coronavirus: what you need to know' course	10 February 2021-31 December 2021	28,990 (86.9)	Medical doctors, dentists
'All about COVID-19 vaccines' course	17 April 2022-31 December 2022	48,328 (75.6)	Nurses
'The safety of COVID-19 vaccines: principles of vaccine vigilance' course	3 March 2022-31 December 2022	43,316 (76.6)	Nurses

CME: continuous medical education; COVID-19: coronavirus disease 19; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.

Table 2. Customer satisfaction of the CME e-learning courses on COVID-19.

Courses' title	Relevance[1]	Quality[2]	Effectiveness[3]	No perception of sponsorship
'COVID-19, the disease caused by the new coronavirus (SARS-CoV-2)' course	99.3%	99.2%	99.4%	92.7%
'Guidelines on COVID-19 treatment options' course	98.5%	98.7%	98.5%	90.1%
'Coronavirus: what you need to know' course	99.0%	98.6%	98.9%	90.3%
'All about COVID-19 vaccines' course	97.2%	97.6%	97.2%	67.2%
'The safety of COVID-19 vaccines: principles of vaccine vigilance' course	96.3%	97.0%	96.4%	69.3%

CME: continuous medical education; COVID-19: coronavirus disease 19; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.
[1]ratings: fairly relevant, relevant, highly relevant; [2]ratings: acceptable, good, excellent; [3]ratings: fairly effective, effective, highly effective.

educational needs. The absence of sponsor perception, 83% overall, decreased relevantly for the two courses on COVID-19 vaccines targeted to nurses (68.3%), a sign that vaccine's distrust might have its place among healthcare professionals too.

Conclusions

These findings suggest that our independent e-learning offer developed and provided over the pandemic period and characterised by continuous updating, achieved wide dissemination and excellent acceptance by the healthcare professionals working in the field. Notably, the 'COVID-19, the disease from the new coronavirus (SARS-CoV-2)' course was recommended by the Italian Ministry of Health as a good quality resource on COVID-19 (14).

As already suggested by the TELL ME project, e-learning can overcome many challenges, preventing large people gathering, allowing time flexibility, and providing homogeneous training (4).

In such a quickly evolving context of emergency, a promising approach consists in the 'rolling e-learning'. The rolling approach has been widely used by the scientific community during the COVID-19 pandemic with two main aims: 1. to promptly respond to the need for continuous and timely update of knowledge and activities or to provide living guidance (15-17); 2. to evaluate and identify potential treatments for COVID-19 in clinical trials (18,19). Even the regulatory agencies adopted rolling reviews as a tool to speed up the assessment and authorisation of promising treatments or vaccines during such a public health emergency (20-22).

Our courses were developed based on the rolling approach to counteract the COVID-9 health emergency and achieved successful results. In 2021 and 2022, the priority of healthcare professional training moved to the topic of vaccines, to which two continuously updated evidence-based courses were dedicated.

It is also worth emphasising that independence is an extremely important requirement for CME, especially for treatments and vaccines' topics, as also referred to by the Code of Medical Ethics of the American Medical Association (AMA), to issue recommendations not influenced by funding or financial interests and to promote trust in professional training (23).

In this context, it is also essential to educate healthcare professionals to communicate with citizens in order to overcome their hesitancy and counteract the misleading 'infodemic' and 'fake news'. Developing lay versions of the e-learning courses aimed at the general population could potentially increase knowledge and awareness.

Based on this experience, we are confident in confirming the list of ten key points for the development of e-learning courses for healthcare professionals during epidemics reported in our communication published at the beginning of the first wave of COVID-19 pandemic (8):

1. Choosing e-learning as an educational tool, to prevent close contacts and transfers
2. Being prompt and responsive, to provide healthcare professionals with adequate information on time
3. Developing brief courses tailored to the participants, to optimise the shortage of time available to healthcare professional
4. Using e-learning platforms that do not require broadband (especially in low resource countries), to facilitate participation
5. Offering the course free of charge, to promote participation
6. Providing information on regulatory sources, to standardise professional behaviours
7. Referring to evidence-based scientific literature, to ensure high quality of information and education in the absence of conflicts of interest
8. Including a section on risk communication in epidemics/pandemics, to make healthcare professionals competent in answering people's questions and needs
9. Listing institutional websites, to counteract misinformation
10. Continuously updating the educational contents (rolling review), to follow the evolution of the situation and the progression of the scientific knowledge.

Our experience shows that during epidemics/pandemics rolling e-learning provides healthcare professionals with updated, evidence-based and tailored information and constitutes an effective tool potentially capable of standardising professional behaviours, counteracting misinformation, providing time flexibility, and ensuring social distancing. Independent education should be offered free of charge to promote participation and should also include a section on risk communication to train healthcare professionals in answering people's questions and needs.

Ethic Committee: All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on medical research and with the Helsinki Declaration of 1975, as revised in 2008.Ethics approval is not required by regulatory authorities in Italy due to: 1. the nature of study (analysis of the participation and satisfaction data about e-learning courses); 2. the full anonymisation of the study participants and of their activities on the platform who agreed for data on their learning activity being used for statistical purposes, and compliance with GDPR 2018 in application of EU Regulation 2016/679); 3. the enrollment of health professionals and not of patients, without any collection of health-related data.In addition, according to the Italian Data Protection Authority in the context of the COVID-19 health emergency, observational studies take advantage of a derogation regime for the duration of the COVID-19 emergency (art. 110 of the Code regarding the protection of personal data, http://www.privacy.it/archivio/privacycode-en.html).

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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Correspondence:
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Maria Rosa Valetto, MD
ORCID n. 0000-0002-5195-5208
Zadig, CME national provider
Via Ampère 59, Milan, 20131 Italy
Phone: +39 027526131
E-mail: valetto@zadig.it