Missed training, collateral damage from COVID 19?

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Acknowledgments: The authors are sincerely grateful to Barbara Racah (barbara.racah@gmail.com) for the language revision of the manuscript.

Author contributions: GS, LB, MM, GMS, and AZ conceived and designed the study; GS, LB, SC, and NF collected and analysed the data; GS, SC GFV and NF interpreted the results of the experiments; GS prepared figures; GS drafted the first version of the manuscript; all authors edited, revised the manuscript, and approved the final version before submission.
Abstract

**Background**: during the COVID-19 pandemic a total lockdown was enforced all over Italy starting on March 9th. This resulted in the shrinking of economic activities. In addition, all formal occupational security-training courses were halted, among them the 81/08 law lectures and Basic Life Support-Defibrillation (BLS-D) laymen training courses. The aim of the study was to evaluate the impact of the pandemic on BLS-D laymen training courses in the Lombardy region.

**Methods**: BLS-D training courses records for the Lombardy region were analysed. The analysis was conducted from 2016 to 2020 as part of the Hippo project.

**Results**: between 2017 and 2019 BLS-D trained laymen kept increasing, moving from 53,500 trained individuals up to 74,700. In 2020 a stark reduction was observed with only 22,160 individuals trained. Formal courses were not halted completely during 2020. Still, in the months available for training, the number of individuals enrolled showed a sharp 50% reduction.

**Conclusions**: laymen training courses for emergency management are a fundamental component of primary prevention practice. The 81/08 and 158/12 Italian laws have decreed this practice mandatory on the workplace. Following the enforcement of the lockdown and the subsequent interruption of emergency management courses, efforts will be necessary to re-establish and guarantee the high quality training of the pre-pandemic period.
Introduction:

On March 11th 2020, the World Health Organization (WHO) declared the COVID-19 emergency a pandemic [1]. In order to limit the spreading of the virus, the Italian government enforced a total lockdown on March 9th which lasted two months [2].

This measure had a strong impact on enterprises. Only those deemed essential kept operating. Personal freedom was also limited due to restrictions on traveling and social activities [2].

The mandatory occupational health-training on workplaces was stopped during the most critical phases of the pandemic. In Italy, according to the 81/2008 law, the first aid manager is to be identified among the employees. Moreover, the 158/2012 law deemed mandatory that an employee be trained in BLS-D practice in certain businesses with specific features. Should an enterprise decide to buy a defibrillator, such trained personnel must intervene in case of cardiac arrest on the workplace [3][4].

BLS-D training and primary prevention projects have repeatedly been shown to be effective in reducing out of hospital deaths due to cardiac arrests [5]. In addition, according to several reports, DL81 lectures have successfully curbed the number of incidents on the workplace and resulted in better emergency management by employees [6].

Despite the positive results, due to the pandemic, the Azienda Regionale Emergenze Urgenze (AREU), the local authority on emergency management and training in the Lombardy region, stopped all training courses starting on February 22nd 2020. The courses resumed on July 14th 2020, following strict preventive measures [7]. All training was halted once more during the second phase of the pandemic, on November 6th 2020 [8], and then resumed on January 12th 2021 [9].

Several papers analysed BLS-D training and updates were implemented in the present protocols. Among them, in order to reduce close contact between students, distance learning was introduced to safely attend theoretical lectures and minimize time spent in the classroom. During practice sessions, the use of personal protective equipment (PPE) was made mandatory so as to reduce the chance of the virus spreading [10]

Quantifying the reduction of trained laymen is fundamental when evaluating the need to increase training courses enrolments in the aftermath of the emergency. A precise analysis is necessary to guarantee the correct number of trained personnel within the emergency system and on the workplace. Furthermore, such analysis is instrumental in safeguarding a minimum number of trained laymen necessary to sustain the Public Access Defibrillator (PAD) project. AREU has entered more than 13000 devices in a publicly available registry online. Such devices are tracked...
through a GPS technology system and can accessed and used by laymen. Should an emergency arise, laymen can properly intervene by using PADs under healthcare personnel guidance through the 112 Unique Emergency Number (Numero Unico Emergenze / NUE).

Our analysis focuses on the main registry of the Lombardy region which, in line with the 158/2012 law, accounts for all trained laymen who successfully completed a BLS-D course and received a certificate.

Methods:

The number of trained laymen was searched for in the main registry of the Lombardy region. The registry is known as “project Hippo”. The database was examined to find out the number of trained personnel and the number of training centres. The data were stratified by year and province.

We analysed personnel registered between 2016 and 2020, in all the different provinces (Brescia, Milano, Bergamo, Pavia, Cremona, Lodi, Mantova, Lecco, Como, Monza, Varese, Sondrio). The number of trained personnel was calculated as a proportion out of the resident population in every single province. Data were obtained by the Istituto Nazionale di Statistica (ISTAT).

The study was conducted in accordance with the principles of the Helsinki declaration and was approved by the AREU Data Protection Officer on 1st March 2021.

Statistical analysis

The categorical variables are presented as number and percentage. The variation between 2019 and 2020 was analysed by means of $\chi^2$ test; the relative odds ratio (OR) and 95% interval confidences (IC95%) were provided. The Prism 8.0.1 statistical software (GraphPad Software LLC, San Diego, CA, USA) was used to this aim.

Results:

Analysing the database, we found a positive increasing trend in the number of BLS-D trained laymen all over the Lombardy region from the beginning of the project. The number of trained personnel has moved up from 53,500 in 2017 up to 74,700 in 2019. This trend abruptly ended in 2020 which registered a sharp 70% reduction compared with 2019 (Table 1).

Different provinces show a different proportion of trained personnel over the general resident population. For instance, within the general population of the Cremona province 0.56% received BLS-D training while 0.90% received BLS-D training in the Como province. The pandemic’s impact has starkly reduced emergency management training in the Lombardy region as seen in
Table 1; during the lockdown period and during the second wave of the pandemic, the number of registered personnel in the regional database was close to zero.

Comparing these data with those reported for the months of September and October in 2019, newly registered BLS-D trained personnel averaged 200 people daily, while in 2020 in the same months newly trained personnel averaged 100 daily, with a 50% reduction.

Figure 1 shows the trend of newly trained personnel every year, starting in 2017.

**Discussion:** the analysis aims to understand the extension of BLS-D training in the Lombardy region and highlight any change subsequent to the COVID-19 pandemic. BLS-D trained personnel kept growing from 2017 to 2019, reaching an abrupt reduction in 2020 due to the restrictions enforced to prevent the coronavirus from spreading. The significative reduction (OR 0.295 [IC95% 0.291-0.300], \( p < 0.0001 \), considering a population of 10,027,602 the 1st January 2020.) in trained personnel must drive us towards a rational and efficient reorganization of the training system. The training centres and certified coaches will most likely face an increased demand from the emergency management institutions and businesses in the post-pandemic period. At the same time, an increase in the number of facilities and trainers is unlikely in the short period. Moreover, the celerity in the setting up of the training courses is of pivotal importance in order to catch up with the lost time, which has led to the missed re-training of certified laymen in 2020.

The possible solutions are the following:

1- Enlargement of the training facilities;
2- Increase in the number of training coaches;
3- Setting up of mandatory distance learning certified courses for the necessary theoretical background.

In particular, this last solution could help meeting the increasing demand for trained personnel. AREU recognizes that the setting up of digital solutions would prove most beneficial and effective. Efficiency may be increased by reaching out to multiple laymen candidates by optimizing the training process. Unfortunately such a solution was not implemented due to time restrictions and resources draining by the pandemic, leading management staff to focus on more pressing matters at hand.

A particular feature, which was highlighted during the analysis, was the evident discrepancy between the single provinces concerning the BLS-D training of laymen. The different type of businesses in one specific province or the different sensibility of the general population towards the topic of emergency management could explain this phenomenon. More data and further research will be necessary to gain more insights and activate specific primary prevention projects.
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Table 1: trained laymen, from 2016 to 2020, by province.

|        | 2017  | 2018  | 2019  | 2020  | 2020-2019 N (%) |
|--------|-------|-------|-------|-------|-----------------|
| Brescia| 6,600 | 10,100| 10,400| 3,900 | -6,500 (-63%)   |
| Milano | 14,600| 20,500| 22,500| 5,900 | -16,600 (-74%)  |
| Bergamo| 5,800 | 6,600 | 7,800 | 2,800 | -5,000 (-64%)   |
| Pavia  | 6,000 | 4,100 | 4,400 | 1,000 | -3,400 (-77%)   |
| Cremona| 1,500 | 1,900 | 2,000 | 600   | -1,400 (-70%)   |
| Lodi   | 1,200 | 1,100 | 1,900 | 770   | -1,130 (-59%)   |
| Mantova| 2,600 | 2,200 | 2,500 | 700   | -1,800 (-72%)   |
| Lecco  | 2,200 | 1,900 | 2,700 | 660   | -2,040 (-76%)   |
| Como   | 3,600 | 4,900 | 5,400 | 1,560 | -3,840 (-71%)   |
| Monza  | 3,600 | 5,600 | 6,500 | 2,000 | -4,500 (-69%)   |
| Varese | 4,400 | 5,800 | 7,200 | 2,100 | -5,100 (-71%)   |
| Sondrio| 1,400 | 1,800 | 1,400 | 170   | -1,230 (-88%)   |
| Lombardia| 53,500| 66,500| 74,700| 22,160| -52,540 (-70%)   |

* OR 0.295 (IC95% 0.291-0.300, p < 0.0001), considering a population of 10,027,602 the 1st January 2020.
Figure 1: trained laymen registered every year.