Enhancing Physicians' Autonomy through Practical Trainings

Giuseppe Stirparo[1,2], Luca Gambolò[1], Dario Bottignole[1], Daniele Solla[1], Martino Trapani[3], Giuseppe Ristagno[4,5], Fabrizio Pregliasco[6], Carlo Signorelli[7]

Abstract

Background. *In medical emergencies adherence to standardized clinical protocols is crucial to ensure a better outcome for patients. Newly qualified physicians may play several roles in serving the National Health Service (substituting general practitioners, on-call duty, working in emergency rooms, etc.) in Italy. In these situations, the physician may have to manage critical patients autonomously. Moreover, newly qualified physicians may show a considerable deficiency in routine medical activities. In fact, many universities do not provide a practical simulation training programme, which is why a substantial number of students only face clinical emergencies when they start working after graduation.*

Study design. *A cross-sectional study was performed by engaging medical doctors. Both experienced physicians and newly licensed physicians (graduated less than 24 months ago) were included in the study.*

Methods. *A questionnaire was distributed to each participant during SIMED's Courses from June 2021 to December 2022. The questionnaire consisted of two sections. The first one analyzed participation in standardized practical courses on medical emergencies (Basic Life Support, Advanced Cardiac Life Support, International Trauma Life Support and a course on Advanced Airway Management). The second section analyzed the perceived autonomy of health professionals in the management of five different work settings, using a 5-point likert scale.*

Results. *2,168 questionnaires were analyzed, of which 68.7% were from newly qualified doctors and 31.3% from more experienced doctors.*

The highest rate of physicians who undertook training courses was achieved for the basic life support course (77.5%) and the lowest rate for the advanced trauma course (15.9%). Physicians perceive themselves the highest autonomy in Primary Care setting (63.1%), while in the Emergency Department they perceive themselves with less autonomy (24.0%). In the analyzed sample, experienced physicians show a higher percentage of autonomy than newly qualified doctors (31.4% vs 8.1%) in all scenarios.

---

[1] SIMED (Società Italiana di Medicina e Divulgazione Scientifica), Parma, Italy
[2] AREU (Agenzia Regionale Emergenza Urgenza, Direzione Medico Organizzativa), Milan, Italy
[3] ASST Rhodense, Public Health Division, Garbagnate Hospital, Milan, Italy
[4] Department of Fisiopatologia Medico-Chirurgica e dei Trapianti, University of Milan, Milan, Italy
[5] Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy
[6] Department of Biomedical Sciences for Health, University of Milan, Milan, Italy
[7] Faculty of Medicine, University of Vita-Salute San Raffaele, Milan, Italy

Conclusions. *Our analysis shows a possible correlation between the self-perceived autonomy of physicians and attending practical simulation courses. Although the role of training through practical courses is relevant, the percentage of trained professionals is insufficient and therefore the implementation of practical training projects has to be encouraged.*

Introduction

Young healthcare professionals should dominate a comprehensive understanding of correct clinical procedures, as a fundamental aspect of their theoretical knowledge acquired during the medical school (1,2). Particularly in emergency situations, the adherence to expedient, well-structured, and regulated protocols is of paramount importance to ensure optimal patient care and ultimately outcome (3). In many European countries, as they embark on their careers, junior physicians frequently have a poor self-confidence regarding qualification in facing different clinical circumstances (4). Thus a critical analysis and reflection upon their theoretical knowledge is needed. In Italy, the term 'newly licensed physicians' (NLPs) is employed to denote junior doctors who have obtained their medical license within the preceding 24 months (5). These physicians typically assume diverse clinical roles within the Italian Healthcare Service (Servizio Sanitario Nazionale-SSN) prior to start a former residency programs. Often, they are engaged as physician for territorial out-of-hours healthcare assistance or as secure freelance contracts within Emergency Departments. In many of these roles, NLPs may encounter medical emergencies (5), with their capacity to respond effectively being pivotal in determining a successful outcome. Notably, NLPs can frequently face out-of-hospital cardiac arrest is one of the typical emergency scenario, in which timely and appropriate intervention is critical to achieve ROSC (Return of Spontaneous Circulation) (6). Skill proficiency in this regard is contingent upon a robust theoretical knowledge (7-9). Nonetheless, simply having theoretical knowledge is not enough for an effective intervention but self-confidence and practical experience are equally important, as widely acknowledged for decades (10).

Regrettably, notwithstanding their extensive involvement within the SSN, NLPs manifest conspicuous deficits in both theoretical and practical knowledge pertaining to emergency management and routine clinical activities, such as medication prescribing and electrocardiogram interpretation (5,11,12). These deficiencies can reduce self-assurance among junior physicians, which, in turn, can detrimentally impact their performance in dynamic and urgent situations (4). Research has evaluated the level of knowledge among medical students concerning emergencies and the findings indicate that they still exhibit poor performance in emergency scenarios (10, 13), even those who are in their final year of medical school (14-16).

Several factors may account for these knowledge gaps, but two are particularly salient: many universities have not provided comprehensive training programs related to emergency management (15), and a substantial number of students have not encountered real-life emergencies prior to graduation (4). Although certain conditions are challenging to witness directly during the medical school, simulations offer a valuable solution for students lacking practical experience. Indeed, simulation training can facilitate the acquisition and refinement of students' knowledge, skills, and self-confidence prior to graduation (3,9). Numerous stakeholders offer both theoretical and practical courses for undergraduate students and NLPs. These courses have garnered considerable interest (17), with participants reporting high levels of satisfaction (18). This is especially true for classes that combine theoretical and practical skills through structured simulations, that lead to increased students' levels of self-confidence and self-awareness on their abilities (3,18).

Despite the wealth of available data, research on the relationship between theoretical knowledge and the ability of NLPs to work independently is limited. Our study aims to explore whether a correlation exists between theoretical training and level of autonomy achieved by young physicians in Italy.

Methods

This is a cross-sectional study, approved in terms of methodology and ethical aspects by the SIMED (Società Italiana di Medicina e Divulgazione Scientifica) research council. Anonymity was maintained for questionnaire respondents, and a privacy assessment was deemed unnecessary, as all data were collected following the acquisition of informed consent.

We recruited medical doctors from participants in the online events of SIMED, including webinar-based free courses and concurrent activities, over the study period spanning from June 5, 2021, to 30 December 2022.

Within the context of this study, we defined "Newly Licensed Physicians" (NLP) as those who had acquired their medical licenses within the preceding 24 months, while "Experienced Physicians" (EP) were characterized by having more than 24 months of licensure.

The questionnaire was structured into two primary sections. The initial segment aimed to ascertain the proportion of physicians who had undertaken practical courses in Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS) (19), ECG interpretation, International Trauma Life Support (ITLS) for pre-hospital trauma care, and Advanced Airway Management (20).

The second part of the questionnaire assessed the self-confidence of physicians in five common scenarios encountered by non-specialized medical practitioners. These scenarios encompassed patients in emergency situations, medicine ward situations, work in an Emergency Department (ED), primary care settings, and antibiotic prescriptions. Responders provided their ratings on a 5-point likert scale, ranging from 1 (indicating minimal autonomy) to 5 (indicating full autonomy). To establish that a participant possessed a perceived level of autonomy deemed adequate, a minimum score of 4 (out of 5) was set as the threshold for questions pertaining to perceived autonomy.

To gauge the overall physicians' preparedness in managing the various clinical scenarios considered, we analyzed their responses across these diverse situations. If a physician scored a minimum of 4 (out of 5) in all of these scenarios, including the emergency ward, medicine ward, primary care, and antibiotic prescription, they were regarded as fully prepared to handle all the presented clinical situations.

Statistical analyses were carried out by comparing continuous variables between NLP and EP using t-tests, while categorical variables were assessed with chi-squared tests. Additionally, logistic regression analysis was conducted to determine the predictive capability of the variables in relation to achieving self-perceived full autonomy.

Results

We engaged with 2,168 medical doctors, consisting of 1,489 (68.7%) NLPs and 679 (31.3%) EPs. Table 1 provides a comprehensive overview of the sociodemographic variables of the entire study cohort, stratified by their level of experience. Additionally, the table highlights the statistical differences between the NLPs and the EPs groups.

Figure 1 reports the distribution frequencies of perceived clinical autonomy among physicians, categorized according to their experience levels. We highlight the percentage of physicians who indicated a highest score of autonomy in all scenarios (5) and those who did not indicate a maximum degree of autonomy in any scenario (0). NLPs declaring themselves autonomous in all scenarios were 8.1%, while the EPs were 31.4%. The percentages who did not indicate the highest score in any scenario were reversed, with NLPs being 29.2% while EPs 7.8%.

Logistic regression analysis assesses the predictive factors influencing the attainment of full autonomy in response to the presented scenarios. The three main predictors under consideration were as follows:
- Courses attended.
- Level of Experience.
- Sex.

Table 2 quantifies the extent to which each predictor influenced the probability that physicians would achieve self-perceived full autonomy, shedding light on the potential impact of attendance, level of experience, and sex on preparedness in the different scenarios explored.

Discussion

Notably, a higher proportion of EPs have successfully completed many specialized training courses like ECG interpretation, Advanced Cardiac Life Support (ACLS), International Trauma Life Support (ITLS), and Airways Management, in contrast to their NLPs counterparts. These courses provide physicians with advanced skills and expertise, enabling them to

Table 1 - Sociodemographic variables and statistical difference in perceived autonomy between NLPs and EPs

	Total (N=2,168)	EP (N=679)	NLP (N=1489)	p	ES
Age (years) M (SD)	30.08 (7.1)	37.1 (8.8)	27.9 (3.4)	<.001	d=1.379
Working Experience (months) M (SD)	32.4 (68.6)	93.6 (97.4)	4.47 (5.6)	<.001	d=1.292
Males N (%)	670 (30.9)	191 (28.1)	479 (32.2)	.059	OR=0.82
ECG course (y) N (%)	1115 (51.4)	390 (57.4)	725 (48.7)	<.001	OR=1.42
BLSD course (y) N (%)	1680 (77.5)	542 (79.8)	1138 (76.4)	0.08	OR=1.22
ACLS course (y) N (%)	512 (23.6)	232 (34.2)	280 (18.8)	<.001	OR=2.24
ITLS course (y) N (%)	344 (15.9)	191 (28.1)	153 (10.3)	<.001	OR=3.42
Airways course N (%)	375 (17.3)	232 (34.2)	143 (9.6)	<.001	OR=4.89
Patient in emergency Perceived Autonomy N (%)	688 (31.7)	368 (54.2)	320 (21.5)	<.001	OR=4.32
out-of-hour service Perceived Autonomy N (%)	888 (41.0)	449 (66.1)	439 (29.5)	<.001	OR=4.67
Primary Care Perceived Autonomy N (%)	1367 (63.1)	523 (77.0)	844 (56.7)	<.001	OR=2.56
Antibiotics Prescription Perceived Autonomy N (%)	1347 (62.1)	557 (82.0)	790 (53.1)	<.001	OR=4.04
E.R. Perceived Autonomy N (%)	520 (24.0)	295 (43.4)	225 (15.1)	<.001	OR=4.32
Number of scenarios in which autonomy is perceived M(SD)	2.22 (1.73)	3.23 (1.6)	1.76 (1.6)	<.001	d=0.923
Autonomy Perceived in All Scenarios (y) N (%)	333 (15.4)	213 (31.4)	120 (8.1)	<.001	OR=5.21

M = average; SD = Standard Deviation; y = Yes; ES = Standard Error

manage specific medical scenarios and ultimately contributing to their overall professional development. However, remarquable is the substantial participation rate in Basic Life Support (BLSD) courses among both EPs and NLPs. While there is a slight difference in completion rates, 79.8% for EPs and 76.4% for NLPs, it is essential to emphasize that this distinction lacks statistical significance (p = 0.08). This observation underscores the shared commitment of both EPs and NLPs to acquiring fundamental life-saving skills, regardless of their experience levels.

The widespread adoption of BLSD training among NLPs signifies a positive trend in healthcare education. It highlights the early instillation of foundational life support skills in physicians' careers, ensuring their preparedness to respond effectively to critical situations at the beginning of their medical practice, as previously reported in existing research (21,22).

EPs exhibit a substantial advantage in their perception of autonomy. These findings underscore the

profound impact of experience on physicians' self-confidence building up and the urgent need for tailored supports to empower physicians at all stages of their careers, while ensuring the provision of high-quality healthcare.

Considering the overall number of clinical scenarios in which autonomy is perceived, the mean number of scenarios perceived by EPs (3.23) significantly surpasses that of NLPs (1.76). The effect size (d) of 0.923 emphasizes this discrepancy, indicating a substantial difference in the breadth of autonomy perceptions. This discovery underscores the progressive nature of medical careers, where autonomy tends to expand as physicians accumulate experience by facing a broader spectrum of clinical scenarios. EPs (31.4%) are over five times more likely to perceive autonomy in all scenarios compared to NLPs (8.1%). This outcome demonstrates the profound transformation in the perception of autonomy that occurs as physicians accumulate experience, fortifying their
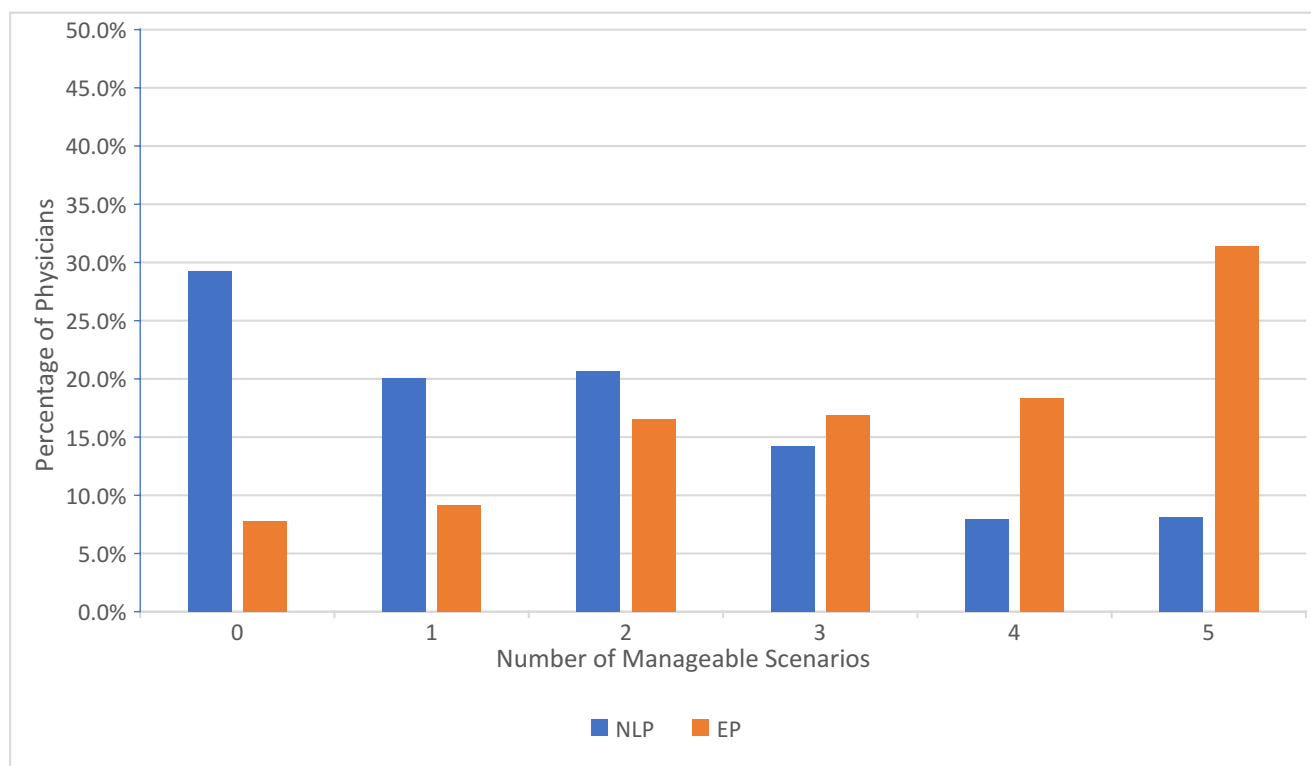
Fig. 1 - Frequency distribution of perceived clinical autonomy, grouped by level of experience.

capacity to act promptly and independently in different healthcare settings.

The logistic regression models presented in this study not only offer valuable insights into the factors influencing full autonomy among physicians but also quantitatively evaluate the extent to which these factors contribute in predicting the likelihood of achieving self-perceived full autonomy (19.9%). A noteworthy revelation is that a substantial portion of the predicted variation can be attributed to the completion of specific training courses (11.3%).

Being male is correlated with an increased likelihood of self-perceived full autonomy, suggesting potential gender-related disparities in this field, that warrant further exploration. EPs exhibit a significantly higher odds ratio (OR) for achieving self-perceived

Table 2 - Logistic Regression Analysis of Predictors on self-perceived Full Autonomy in Responding to Presented Scenarios.

Predictor	Estimate	SE	Z	P	OR
Intercept	-4.254	0.241	-17.67	<.001	0.0142
Male Sex	0.467	0.146	3.21	0.001	1.596
More than 24 months of experience	1.268	0.144	8.78	<.001	3.555
ECG interpretation expertise	0.834	0.154	5.42	<.001	2.304
BLSD provider	0.698	0.210	3.32	<.001	2.010
Airways Expertise	1.030	0.162	6.37	<.001	2.802
ACLS provider	0.610	0.155	3.93	<.001	1.840
ITLS provider	1.101	0.163	6.76	<.001	3.008

full autonomy compared to NLPs, underscoring the profound impact of experience on autonomy perceptions. Upon examining the individual predictor coefficients in the models, it becomes evident that training courses, such as ECG, BLSD, AIRWAYS, ACLS, and ITLS, play a pivotal role in predicting full autonomy. Physicians who have completed these courses demonstrate significantly higher odds in perceiving full autonomy in their practice, compared to those who did not complete the courses. These courses contribute substantially to the overall predictive power of the models. During these specific trainings, numerous scenarios and protocols are analyzed, and various elements that might instil fear in physicians, such as difficult maneuvers with the potential to cause irreversible harm to the patient, are practiced and discussed (23).

It is essential to clarify why EPs also exhibit a notably higher percentage of practical course completions. One plausible explanation could be that, based on the specialization or on the individual experience, physicians may opt to undertake such courses to acquire specific skills and competencies required in emergency settings. In certain healthcare institutions, these courses are integrated into training programs. In Italy, there is no mandatory training regimen for healthcare professionals. However, in alignment with the provided data, we could contemplate the implementation of mandatory training for NLPs when they begin their professional roles. This could be a valuable step to ensure that medical practitioners who are starting their careers without the experience of EPs receive the necessary training and guidance.

NLPs tend to report lower self-perceived autonomy, but our study suggests that participation in practical courses could serve as an influential factor in elevating this perception. The completion of specific training courses not only impart essential clinical competencies but also improve the confidence and attitude needed to navigate through complex medical scenarios. Consequently, this contributes to a heightened perception of autonomy among physicians who have undergone such training. This observation carries substantial significance and should be a point of reflection for Italian universities, as they delineate the educational paths for students in accordance with the qualifying degree (17,24).

This article has some limitations. The physicians engaged in SIMED's training courses could potentially be less prepared for practical work due to limited clinical exposure and less practical training. Secondly, we record self-reported participation in practical course

without validation of actual certificates. Regarding future implementation, the topic of the degree of autonomy of new doctors is very relevant, therefore a national survey, mediated by the universities or Register of doctors could be considered.

Conclusions

Our study has brought to light the substantial disparity in perceived autonomy between experienced physicians and newly licensed physicians. Notably, we have observed that specific training courses play a pivotal role in enhancing self-autonomy. However, it is regrettable that experienced physicians tend to be more inclined to participate in this type of training, compared to newly licensed ones. As a result, there is a compelling case for promoting and strongly recommending practical training to bridge this gap. In many instances, it could be effectively integrated into the curricula of Italian university courses, ensuring that the next generation of physicians benefits from such valuable preparation.

Riassunto

Migliorare l'autonomia dei medici attraverso la formazione pratica

Introduzione. L'aderenza a protocolli clinici standardizzati da parte dei sanitari è cruciale per garantire una miglior outcome per i pazienti. I medici italiani neo-abilitati possono svolgere diversi ruoli al servizio del Sistema Sanitario Nazionale (sostituzione di medici di medicina generale, turni in guardia medica e in alcuni pronto soccorsi ecc.). In queste situazioni il medico potrebbe dover gestire dei pazienti critici in autonomia. Purtroppo, i giovani medici potrebbero non essere autonomi, soprattutto a causa di una notevole carenza nelle attività mediche routinarie. Infatti, molte università non forniscono un programma completo di formazione attraverso simulazione pratica. Per questo motivo, un numero rilevante di studenti fronteggia emergenze cliniche solo dopo la laurea.
Disegno dello studio. È stato condotto un cross sectional study attraverso la distribuzione di un questionario. Nello studio sono stati

arruolati sia medici con esperienza che medici neo-abilitati (laureati da meno di 24 mesi).

Metodi. È stato distribuito un questionario a tutti i partecipanti ai corsi organizzati da SIMED dal giugno 2021 al dicembre 2022. Ogni partecipante ha completato un questionario composto da due sezioni. La prima analizzava la partecipazione a corsi pratici standardizzati sulle emergenze mediche (Basic Life Support, Advanced Cardiac Life Support, International Trauma Life Support e un corso sulla Gestione Avanzata delle vie aeree). La seconda sezione analizzava l'autonomia percepita dal sanitario nella gestione di cinque differenti setting lavorativi, attraverso una scala 5-point likert scale.

Risultati. Sono stati analizzati 2.168 questionari, di questi il 68,7% erano medici neo-abilitati e il 31,3% medici esperti. Riguardo la percentuale di medici che hanno seguito i corsi di formazione, la percentuale più alta di soggetti formati è stata registrata per il Basic Life Support (77,5%) e la più bassa per il corso di traumatologia avanzata (15,9%). Il setting delle Cure Primarie è quello in cui i medici si percepiscono più autonomi (63,1%), mentre il Dipartimento di Emergenza è quello in cui si percepiscono meno autonomi (24,0%). Nel campione da noi analizzato, la percentuale di medici che si sono dichiarati autonomi in tutti gli scenari sottoposti è stata maggiore tra i medici con maggiore esperienza rispetto ai medici neoabiliati (31.4% vs 8.1%).

Conclusioni. L'analisi mostra una possibile correlazione tra l'autonomia percepita dei medici e il completamento di un corso pratico mediante simulazione. Nonostante il ruolo della formazione mediante corsi pratici sia rilevante, la percentuale di professionisti formati risulta ancora insufficiente. Per questo motivo ci si auspica l'implementazione di progetti di formazione pratici.

References

1. Steiner-Hofbauer V, Schrank B, Holzinger A. What is a good doctor? Wien Med Wochenschr. 2018 Nov; **168**(15-16): 398-405. doi: 10.1007/s10354-017-0597-8. Epub 2017 Sep 13.

2. Black C, Craft A; Academy of Medical Royal Colleges. The competent doctor: a paper for discussion. Clin Med (Lond). 2004 Nov-Dec; **4**(6): 527-533. doi: 10.7861/clinmedicine.4-6-527.

3. Ruesseler M, Weinlich M, Müller MP, Byhahn C, Marzi I, Walcher F. Republished: Simulation training improves ability to manage medical emergencies. Postgrad Med J. 2012 Jun; **88**(1040): 312-316. doi: 10.1136/pgmj-2009-074518rep.

4. Freund Y, Duchateau FX, Baker EC, Goulet H, Carreira S, Schmidt M, et al. Self-perception of knowledge and confidence in performing basic life support among medical students. Eur J Emerg Med. 2013 Jun; **20**(3): 193-196. doi: 10.1097/MEJ.0b013e328355fd59.

5. Bellini L, Gambolò L, Solla D, Stirparo G. Am I ready? Self-Perceived Clinical Autonomy In Italian Newly Licensed Physician. EuroMediterranean Biomed J. 2023 Feb; **18**(4): 19–22. doi: 10.3269/1970-5492.2023.18.4 Available from: http://www.embj.org/embj/am-i-ready-self-perceived-clinical-autonomy-in-italian-newly-licensed-physicians/ [Last accessed: 2024 Apr 27].

6. Stirparo G, Fagoni N, Bellini L, Oradini-Alacreu A, Migliari M, Villa GF, et al.B Cardiopulmonary resuscitation missed by bystanders: Collateral damage of coronavirus disease 2019. Acta Anaesthesiol Scand. 2022 Oct; **66**(9): 1124-1129. doi: 10.1111/aas.14117. Epub 2022 Aug 5.

7. Bellini L, Fagoni N, Andreassi A, Sechi GM, Bonora R, Stirparo G. Effectiveness of Cardiopulmonary Resuscitation at the Workplace. Med Lav. 2023 Jun 12; **114**(3): e2023010. doi: 10.23749/mdl.v114i3.13995.

8. Sturla MI, Kacerik E, Andreassi A, Pacciolla L, Villa GF, Sechi GM, et al. Out of hospital cardiac arrest in sporting facilities: an overview of rescue for sideline doctors. Med Sport. 2023 Mar; **76**(1): 70-78. doi: 10.23736/S0025-7826.23.04231-X.

9. Stirparo G, Pireddu R, Kacerik E, Scognamiglio T, Andreassi A, Sechi GM, et al. Stroke and the need for immediate assistance at the place of onset: the future of mandatory training for lay people in Italy. Ann Ig. 2023 Jul-Aug; **35**(4): 480-485. doi: 10.7416/ai.2022.2553. Epub 2022 Dec 15.

10. Price CS, Bell SF, Janes SE, Ardagh M. Cardio-pulmonary resuscitation training, knowledge and attitudes of newly-qualified doctors in New Zealand in 2003. Resuscitation. 2006 Feb; **68**(2): 295-299. doi: 10.1016/j.resuscitation.2005.07.002. Epub 2005 Dec 1.

11. Brinkman DJ, Tichelaar J, Graaf S, Otten RHJ, Richir MC, van Agtmael MA. Do final-year medical students have sufficient prescribing competencies? A systematic literature review. Br J Clin Pharmacol. 2018 Apr; **84**(4): 615-635. doi: 10.1111/bcp.13491. Epub 2018 Jan 25.

12. McClennen S, Nathanson LA, Safran C, Goldberger AL. ECG Wave-Maven: An Internet-based Electrocardiography Self-Assessment Program for Students and Clinicians. Med Educ Online. 2003 Dec; **8**(1): 4339. doi: 10.3402/meo.v8i.4339.

13. Robak O, Kulnig J, Sterz F, Uray T, Haugk M, Kliegel A, et al. CPR in medical schools: learning by teaching BLS to sudden cardiac death survivors--a promising strategy for medical students?. BMC Med Educ. 2006 Apr; **6**:27. doi:10.1186/1472-6920-6-27.

14. Baldi E, Contri E, Bailoni A, Rendic K, Turcan V, Donchev N, et al. Final-year medical students' knowledge of cardiac arrest and CPR: We must do more! Int J Cardiol. 2019 Dec 1; **296**: 76-80. doi: 10.1016/j.ijcard.2019.07.016. Epub 2019 Jul 8.

15. Contri E, Bonomo MC, Costantini G, Manera M, Bormetti M, Tonani M, et al. Are final year medical students ready to save lives in Italy? Not yet. Emerg Med J. 2017 Aug; **34**(8): 556. doi: 10.1136/emermed-2017-206748. Epub 2017 Jun 21.

16. Bhatnagar V, Tandon U, Jinjil K, Dwivedi D, Kiran S, Verma R. Cardiopulmonary Resuscitation: Evaluation of Knowledge, Efficacy, and Retention in Young Doctors Joining Postgraduation Program. Anesth Essays Res. 2017;**11**(4):842-846. doi:10.4103/aer.AER_239_16.

17. Stirparo G, Solla D, Gambolò L, Bellini L, Mantovanelli L, Trapani M, et al. SIMED-New Doc course, a matter of reflection. Acta Biomed. 2023 Feb 13; **94**(1): e2023035. doi: 10.23750/abm.v94i1.13959.

18. Stirparo G, Gambolò L, Bellini L, Medioli F, Bertuol M, Guasconi M, et al. Satisfaction evaluation for ACLS training. Acta Biomed. 2022 Jul 1; **93**(3): e2022260. doi: 10.23750/abm.v93i3.13337.

19. Wyckoff MH, Greif R, Morley PT, Ng KC, Olasveengen TM, Singletary EM, et al. 2022 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations: Summary From the Basic Life Support; Advanced Life Support; Pediatric Life Support; Neonatal Life Support; Education, Implementation, and Teams; and First Aid Task Forces. Circulation. 2022 Dec 20; **146**(25): e483-e557. doi: 10.1161/CIR.0000000000001095. Epub 2022 Nov 3.

20. Jayaraman S, Sethi D, Wong R. Advanced training in trauma life support for ambulance crews. Cochrane Database Syst Rev. 2014 Aug 21; **2014**(8): CD003109. doi: 10.1002/14651858.CD003109.pub3.

21. Semeraro F, Scapigliati A, Tammaro G, Olcese U, Cerchiari EL, Ristagno G. Advanced life support provider course in Italy: A 5-year nationwide study to identify the determinants of course success. Resuscitation. 2015 Nov; **96**: 246-251. doi: 10.1016/j.resuscitation.2015.08.006. Epub 2015 Aug 22.

22. D'Agostino F, Agrò FE, Fusco P, Ferri C, Ristagno G; Training Group Collaborators. Specific theorical and practical education on mechanical chest compression during advanced life support training courses - Results from a local experience. Resuscitation. 2022 Dec; **181**: 147-149. doi: 10.1016/j.resuscitation.2022.11.004. Epub 2022 Nov 14.

23. Magliocca A, Manfredi M, Olivari D, De Giorgio D, Cucino A, Zani DD, et al. High quality chest compression: Don't be afraid of breaking ribs to gain a life! Heart Lung. 2019 Mar-Apr; **48**(2): 173-174. doi: 10.1016/j.hrtlng.2018.12.004. Epub 2019 Jan 10.

24. Wunderlich R, Ragazzoni L, Ingrassia PL, Corte FD, Grundgeiger J, Bickelmayer JW, et al. Self-Perception of Medical Students' Knowledge and Interest in Disaster Medicine: Nine Years After the Approval of the Curriculum in German Universities. Prehosp Disaster Med. 2017 Aug; **32**(4): 374-381. doi: 10.1017/S1049023X17000280. Epub 2017 Apr 5.

Corresponding author: Giuseppe Ristagno, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy
e-mail: giuseppe.ristagno@unimi.it