Preservation of Basic Life Support Competencies Among Certified First Responders

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Article

Preservation of Basic Life Support Competencies Among Certified First Responders

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Abstract

Background and Objectives: Slovenia, as many other European nations, have introduced voluntary first responders to enhance survival rates in out-of-hospital cardiac arrests. In currently published research exists no conclusive data on the optimal retraining interval, categorizing recommendations as expert opinion with limited reliability. *Materials and Methods*: Experimental prospective research was conducted on newly certified (N = 342) and senior (N = 140) licensed first responders (LFRs) in Slovenia, in accordance with national guidelines. LFRs were reassessed for retention of skills and knowledge one year after previous certification. Additionally, each cohort was classified into groups according to the number of interventions they engaged in over the past year, and their retention of skills and knowledge was assessed. *Results*: In the initial year of service, no statistically significant decline in skills (median 53 [52-54] vs. 53 [50-54]; $p = 0.059$) and knowledge (median 10 [9-10] vs. 9 [9-10]; $p = 0.458$) was observed among new LFRs. In contrast, senior LFRs exhibited a marked reduction in skills (median 51 [49-54] vs. 54 [52-55]; $p < 0.001$) until recertification, although their knowledge (median 9 [8.5-10] vs. 10 [9-10]; $p = 0.091$) remained stable. The frequency of interventions did not affect the new LFRs; however, there was a significant decrease in skill (median 49 [47-51] vs. 54 [52-55]; $p < 0.001$) retention among senior LFRs who did not participate in any interventions during the previous certification period. Notably, senior LFRs who engaged in at least one intervention did not demonstrate any decline in skills (median 52 [50-54] vs. 54 [52-55]; $p = 0.117$). No reduction in knowledge was detected. *Conclusions*: Initial training for Slovenian LFRs has been found to be adequate. However, senior LFRs experience a decline in skills if they do not participate in interventions during the certification period. A different strategy for recertifying senior LFRs should be adopted, considering the number of interventions they have been involved in during this time.

Keywords: first responders; CPR; education; resuscitation; volunteers; training; certification; emergency responders; emergency; out-of-hospital cardiac arrest

1. Introduction

Out-of-hospital cardiac arrest (OHCA) ranks among the leading causes of potentially avoidable fatalities, with inevitable outcomes if no action is taken. In both, the United States and Europe, approximately 350,000 to 450,000 OHCA occur annually [1,2]. A recent study has established that the annual incidence of OHCA in Slovenia is 77.32 per 100,000 individuals, which corresponds to an approximate incidence of 1,624 per year for Slovenia's population of 2.1 million [3].

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In an effort to maximize survivability, at least 18 European countries have implemented systems that incorporate first responders either fully or partially. In this context, first responders are defined as volunteers who are alerted to OHCA incidents by dispatch centers [4]. In 2016, following the completion of pilot studies, the Slovenian Resuscitation Council (SloRS) introduced a standardized licensing system for first responders nationwide, although this standard remains non-mandatory to this day [5]. SloRS followed the recommendation from the European Resuscitation Council's (ERC) Guidelines on annual retraining to determine the recertification period. The current ERC Guidelines recommend a retraining interval for first responders that spans from a few months to a year, while clearly stating that there is no definitive research data available and that additional research is necessary. Neither the guidelines nor the SloRS recommendation clarifies whether a first responder who has missed at least one recertification needs to retake the basic course or if completing the recertification course alone is sufficient [6].

According to the ERC Guidelines 2021, the educational objectives for first responders encompass mastering effective chest compressions and the safe operation of an Automated External Defibrillator (AED), as well as acquiring ventilation skills in pediatric Basic Life Support (BLS) [6]. In Slovenia, the basic course for licensed first responders (LFR) also includes training on handling airway obstructions caused by foreign objects and managing significant external bleeding. The advanced module further educates participants on responding to recent strokes, chest pain, and introduces them to oxygen delivery methods and ventilation techniques using more sophisticated ventilation equipment [7]. The majority of LFRs in the country are currently comprised of volunteer firefighters, as they are already equipped with pagers for receiving alerts and have insurance coverage for injuries or liability [5].

Our study aimed to assess whether LFRs maintain a satisfactory level of theoretical knowledge and practical skills in cardiopulmonary resuscitation (CPR) by the end of their license validity period. To this end, we evaluated newly licensed LFRs prior to their first recertification, as well as a cohort of more experienced LFRs. Additionally, we investigated the impact of the number of interventions during the certification period on the retention of knowledge and skills. By gaining a deeper insight into how first responders retain knowledge and skills, we can enhance the educational framework for first responders in Slovenia and beyond.

2. Materials and Methods

Our study started in 2019, and the last questionnaire from initial certification courses was returned in 2024. A total of 534 sets of questionnaires for initial certification courses were distributed to prehospital units throughout Slovenia during this five-year period. Before the recertification courses took place, additional batches of questionnaires were distributed at the end of the initial certificates' validity, according to the expected number of recertification candidates - another 400 sets. The last recertification questionnaires included in the present research were returned in early 2025.

2.1. Goals

Our primary research goal was to determine the differences in retention of resuscitation knowledge and skills in a certain period after initial certification among new and senior LFRs. Additionally, we examined the impact of the number of interventions between certifications on the retention of knowledge and skills.

2.2. Research Design

Research was conducted by experts (emergency medicine specialists) in 8 prehospital units on 26 volunteer fire departments nationwide. We used an experimental research strategy with a longitudinal time frame. Firstly, we educated the cohort of candidates on the new LFR and tested it immediately after the training process to establish their peak knowledge and skill level on the topic. A formally established education and certification procedure for LFR in Slovenia was used. As SloRS

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recommendation suggests, LFRs are issued a license for one year after they successfully finish a 10-hour course on CPR with AED utilization according to the current ERC Guidelines, control of important external bleeding, and foreign body airway obstruction, set by the Rules on Emergency Medical Service published in the Official Journal of the Republic of Slovenia [7]. Satisfactory levels of knowledge and skills are demonstrated by passing both the theoretical test and the practical examination, as recommended by the Slovenian Extended Professional College for Emergency Medicine. Annual recertification, composed of a minimally 5-hour refresher course, a theoretical test, and a practical examination, is needed [7,8].

New LFRs we re-evaluated for skills and knowledge retention after one year. Re-evaluation took place before the first recertification. Additionally, in 2020, 2023, and 2024, we tested a cohort of senior LFRs, defined as LFRs who are still active and have at least 5 years of experience following initial certification. We tested them before their yearly recertification to compare their skill and knowledge retention with that of the new certified LFRs. All new certified LFRs that were tested immediately after initial certification were included. This group represents inexperienced LFRs who possess a satisfactory level of skill and theoretical knowledge, as required by the regulations. At re-evaluation, we were looking forward to gathering some additional data, for example, the number of interventions in the meantime between the previous certification and recertification.

Practical resuscitation skills were assessed using the modified Cardiff test, specifically the Cardiff-19 test. The test consists of 19 questions (representing specific tasks) with answers as part of a structured grading system. Points were assigned based on the correctness, usefulness, and non-harmfulness of performance on a specific task or step in the protocol. The maximal score was 55 points, while the lowest possible was 19 points.

Data about theoretical knowledge were collected with a questionnaire composed of questions recommended by SloRS at the time of our preliminary research design planning [9]. It contains 9 questions, each with one correct answer out of 4 available options, and one question with a number scale to mark the correct answer. The total possible points achieved is 10, with a minimal number of 0 points [9].

We also examined how the number of interventions first responder had participated in following the last certification affected the retention of resuscitation knowledge and skills across all the previously mentioned groups. Prior to performing a statistical analysis, the new LFRs were categorized based on interventions into three groups: 1, no interventions; 2, one intervention; and 3, two or more interventions after initial certification. Similarly, we categorized senior LFRs into two groups: (1) no interventions, and (2) one or more interventions after the last recertification.

2.3. Data Analysis

A database was established for analysis and subsequently imported into the statistical analysis software, Jamovi v2.6.26. A p-value of less than 0.05 was considered to indicate statistical significance, where applicable.

The Shapiro-Wilk test was employed to assess the normality of the distribution. To investigate the retention of resuscitation skills and theoretical knowledge by new LFRs until the day of their first recertification, descriptive statistics analysis was performed. The non-parametric Wilcoxon signed-rank test was used when the distribution was non-normal; otherwise, the parametric paired sample t-test was used. To compare the skills and knowledge of senior LFRs with those of newly certified LFRs, statistical analysis of the independent variable was required. If the Shapiro-Wilk test indicated that the data were not normally distributed, we used the Mann-Whitney U-test; otherwise, we employed the independent sample t-test.

3. Results

Of the 534 questionnaires distributed during the initial courses, 342 were completed and returned, yielding a response rate of 64%. An additional 400 questionnaires were distributed for assessments conducted prior to the first recertification. Our team successfully re-evaluated 97 LFR

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participants after a one-year interval following their initial certification. Additionally, 140 senior LFR participants were assessed prior to their regular recertification to compare their resuscitation skills and theoretical knowledge with those of new certified LFRs. Most of the returned questionnaire sets were fully completed, with only a small proportion containing missing data or incomplete responses. Cases with missing crucial values were not included in specific statistical analysis – percentage varied 0–7 %.

3.1. New LFRs' Skill and Knowledge Retention

LFR participants demonstrated similar skill retention scores immediately following the initial course compared to assessments conducted prior to the first re-evaluation (N = 97). We were unable to demonstrate statistically significant differences in theoretical knowledge retention scores between the assessments conducted after the initial course and the first re-evaluation (N = 94). Results are collected in Table 1.

Table 1. Retention of skill and knowledge among licensed first responders (LFRs).

Group	Skills		Knowledge	
New LFRs (Median [IQR]; p-value)*	53 [52-54] vs. 53 [50-54]	p = 0.059	10 [9-10] vs. 9 [9-10]	p = 0.458
Senior LFRs (Median [IQR]; p-value)**	51 [49-54] vs. 54 [52-55]	p < 0.001	9 [8.5-10] vs. 10 [9-10]	p = 0.091

*Compared to their own results on the initial certification a year prior. **Compared to the results of the LFRs on the initial certifications. Abbreviations: LFRs, licensed first responders; IQR, interquartile range.

3.2. Senior LFRs' Skill and Knowledge Retention

Skill retention scores among senior LFR participants prior to annual recertification were significantly lower than in the new certified LFRs group (N = 131 vs. 337). In contrast, theoretical knowledge scores among senior LFRs did not differ significantly from the new certified LFRs group (N = 131 vs. 333), as represented in Table 1.

3.3. Impact of Participating in Interventions on Skills and Theoretical Knowledge Retention

We conducted a statistical analysis of the groups formed based on the number of interventions they participated in following their initial certification. The analysis among new LFRs revealed no statistically significant difference in skill retention among the three groups: those without intervention (N = 39), those with one intervention (N = 17), and those with two or more interventions (N = 37). No significant difference was also found in theoretical knowledge retention in any of the groups.

Table 2. The impact of the number of interventions on the retention of skills and knowledge among new LFRs compared to their own results on the initial certification a year prior.

	New LFRs			
Number of interventions	Skills		Knowledge	
No intervention (Median [IQR]; p-value)	53 [50-54] vs. 54 [48-53]	p = 0.135	10 [9-10] vs. 9 [9-10]	p = 0.211
1 (Median [IQR]; p-value)	53 [52-55] vs. 52 [51-55]	p = 0.095	8.53 ± 1.23 vs. 8.65 ± 1.27*	p = 0.605
2 or more (Median [IQR]; p-value)	52.5 ± 4.31 vs. 52.1 ± 3.63*	p = 0.169	10 [9-10] vs. 10 [9-10]	p = 0.842

*Due to non-normally distributed data, results are represented as: Mean ± SD; p-value.

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Senior LFRs were also divided into two groups: those without intervention and those with at least one intervention after the last certification. Their skills and theoretical knowledge were compared to new certified LFRs. The group without intervention (N = 28) demonstrated significantly inferior performance in skills, but no difference in theoretical knowledge retention. There were no statistically significant differences in skill or knowledge retention between LFRs who participated in interventions (N = 102) and new LFRs following initial certification. Results are represented in Table 3.

Table 3. The impact of the number of interventions on the retention of skills and knowledge among senior LFRs compared to the results on the initial LFRs certifications.

	Senior LFRs			
Number of interventions	**Skills**		**Knowledge**	
No intervention (Median [IQR]; p-value)	49 [47-51] vs. 54 [52-55]	$p < 0.001$	9.5 [8-10] vs. 10 [9-10]	$p = 0.439$
1 or more (Median [IQR]; p-value)	52 [50-54] vs. 54 [52-55]	$p = 0.117$	9 [9-10] vs. 10 [9-10]	$p = 0.102$

4. Discussion

Our research indicates that the officially recommended initial certification course for LFRs in Slovenia is adequate. No significant decline in skills or knowledge was observed among new LFRs prior to their first annual recertification, irrespective of the number of interventions they participated in. Conversely, a notable decline in skill performance was observed among senior LFRs, although their knowledge remained intact. We determined that the decline in skill performance was directly correlated with the number of interventions in which they participated. Senior LFRs who had participated in at least one intervention since their last certification did not exhibit any decline in skills.

4.1. Retention of Skill and Knowledge

Extensive debate and research have been conducted regarding the training and retraining of laypersons as potential bystanders or passively alerted non-professionals in the event of an OHCA incident nearby [10,11]. The retraining period for these groups remains inadequately defined. Consequently, ERC Guidelines 2021 provide only recommendations for the retraining period on CPR for laypersons, lacking concrete research to substantiate these recommendations and relying predominantly on expert opinion [6]. Similarly, SloRS has forwarded this recommendation to the educators of the Slovenian LFRs [9]. Furthermore, LFRs in Slovenia occupy a unique position that does not align precisely with the categories of healthcare professionals or complete laypersons. They are integrated into the official alert system, their interventions are recognized as official, and they hold licenses that require annual renewal through a recertification course. Although the majority of LFRs participate on a voluntary basis, their involvement is considered part of the operations of emergency protection, rescue, and relief services. This situates them in a semi-professional category, for which no specific retraining period is currently delineated [6,8]. Due to the non-mandatory nature of these recommendations and their lack of robust empirical foundations, some educators in Slovenia do not follow the annual retraining and curriculum recommendations. As a result, Slovenia employs various retraining time periods and levels of retraining comprehensiveness. Our research initiated an investigation into this issue by assessing whether the recommended annual retraining is sufficient for LFRs' minimal skill and knowledge retention. The results indicated that new LFRs do not exhibit any decline in skills and theoretical knowledge after one year, in contrast to senior LFRs, who experience a significant decline in skills but maintain a sufficient level of knowledge retention. As indicated in past research, a different approach might be needed for more experienced participants [12].

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4.2. Impact of the Number of Interventions

Current research on skill retention among healthcare professionals consistently indicates a rapid decline in CPR competencies following training [13]. In contrast, recent investigations into emergency medicine (EM) physicians, who frequently manage cardiac arrest cases, suggest that supplementary BLS retraining does not enhance their CPR performance [14]. The diverse spectrum of healthcare professions leads to considerable variation in the frequency with which professionals encounter CPR scenarios. These findings suggest that the frequency of real-life CPR interventions may be pivotal in skill retention among healthcare workers [13,14]. Similarly, our research corroborated that for more experienced LFRs, actual interventions were crucial in maintaining skill levels. Senior LFRs who did not participate in intervention encountered difficulties in maintaining their skill levels by the conclusion of their certification validity period, in contrast to their peers who engaged in interventions. This could be attributed to the fact that recertification training is typically shorter than initial certification, or it might be due to their altered perspective and attitude after many years of involvement. This suggests that an alternative strategy for the retraining of experienced LFRs may be necessary, such as through the method of learning by teaching [12]. Nevertheless, they did not demonstrate any decline in theoretical knowledge prior to recertification. Notably, among the new LFRs, there was no observed decline in skills or knowledge, regardless of their participation in interventions. This finding confirms the adequacy of Slovenian initial training for LFRs and first recertification after one year, particularly when compared to other studies that have observed significant declines in similar contexts over even shorter time periods [15].

4.3. Limitations

Firstly, due to the COVID-19 pandemic in 2020 and 2021, we were unable to test any LFRs or provide them with resuscitation skills or knowledge repetition during that period, as daily migrations outside the municipality were restricted without a highly excusable reason. In addition, all activities that could facilitate aerosol transmission of the virus, including even LFR activations for a brief period, were prohibited. Thus, from mid-2020 to early 2022, we did not collect any data. This is also the reason we had to extend our research to obtain at least a minimal number of cases, ensuring the research is representative. Participants initially tested in 2019 and 2020 could only be included in the general LFR population, representing peak practical performance and theoretical knowledge level after first certification.

Secondly, in comparison to new LFRs, most senior LFRs passed the initial certification course years before our research began; we did not have data on their peak performance in either practical or theoretical aspects after completing the initial course. We were only able to compare their present abilities with the average performance of new LFRs at the end of initial courses. Therefore, we could not analyze data as paired samples, but we had to use independent sample statistical analysis.

Thirdly, expert examiners also reported various limitations that led to dropped cases; the most prevalent reasons were technical issues, LFR not showing up on the recertification course, and a lack of time for additional work with the research protocol, among others. Furthermore, numerous new LFRs successfully completed recertification in courses not conducted by our team of experts.

5. Conclusions

Our research did not find any significant deterioration in the BLS skills and knowledge of new LFRs after one year, regardless of the number of interventions. An extensive basic training program proves as sufficient.

Senior LFRs demonstrated a decline in BLS skills prior to their annual recertification. This decline was observed exclusively among those senior LFRs who had not engaged in any BLS interventions since their last certification. Conversely, senior LFRs who participated in such interventions did not exhibit any deterioration in skills. All participants performed well in assessments of theoretical knowledge.

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Given that the primary distinction between basic and refresher training sessions lies in their extensiveness, it might be beneficial to allocate additional training time for senior LFRs who do not regularly engage in interventions. Further research is needed to determine whether senior LFRs who participate in regular interventions throughout the year require less hands-on training, allowing for more resources to be directed toward additional sessions for those without such interventions. These findings also raise the question of whether more comprehensive retraining should be implemented for LFRs who have missed annual certification or have not participated in any BLS interventions for an extended period.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Ruiz Azpiazu, J.I.; Fernández Del Valle, P.; Escriche, M.C.; Royo Embid, S.; Fernández Barreras, C.; Azeli, Y.; Juanes García, M.; Batres Gómez, S.; Valenciano Rodríguez, J.; Luque Hernández, M.J.; et al. Incidence, treatment, and factors associated with survival of out-of-hospital cardiac arrest attended by Spanish emergency services: report from the Out-of-Hospital Spanish Cardiac Arrest Registry. *Emergencias* **2024**, doi:10.55633/s3me/014.2024.
2. Tseng, Z.H.; Nakasuka, K. Out-of-Hospital Cardiac Arrest in Apparently Healthy, Young Adults. *JAMA* **2025**, *333*, 981, doi:10.1001/jama.2024.27916.
3. Petravić, L.; Miklič, R.; Burger, E.; Keše, U.; Kulovec, D.; Poljanšek, E.; Tomšič, G.; Pintarič, T.; Lopes, M.F.; Brezovnik, M.; et al. Enhancing Bystander Intervention: Insights from the Utstein Analysis of Out-of-Hospital Cardiac Arrests in Slovenia. *Medicina (Mex.)* **2024**, *60*, 1227, doi:10.3390/medicina60081227.
4. Tjelmeland, I.B.M.; Masterson, S.; Herlitz, J.; Wnent, J.; Bossaert, L.; Rosell-Ortiz, F.; Alm-Kruse, K.; Bein, B.; Lilja, G.; Gräsner, J.-T.; et al. Description of Emergency Medical Services, Treatment of Cardiac Arrest Patients and Cardiac Arrest Registries in Europe. *Scand. J. Trauma Resusc. Emerg. Med.* **2020**, *28*, 103, doi:10.1186/s13049-020-00798-7.
5. Goričan, I.; Strnad, M. First responders - experiences to date. In Proceedings of the Urgentna medicina: izbrana poglavja 2017 : zbornik = Emergency medicine : selected topics [2017] : proceedings; Vajd, R., Gričar, M., Prestor, J., Bračko, V., Eds.; Slovenian Society for Emergency Medicine: Ljubljana, 2017; pp. 30–34.
6. Greif, R.; Lockey, A.; Breckwoldt, J.; Carmona, F.; Conaghan, P.; Kuzovlev, A.; Pflanzl-Knizacek, L.; Sari, F.; Shammet, S.; Scapigliati, A.; et al. European Resuscitation Council Guidelines 2021: Education for Resuscitation. *Resuscitation* **2021**, *161*, 388–407, doi:10.1016/j.resuscitation.2021.02.016.
7. Kolar Celarc, M. Pravilnik o Službi Nujne Medicinske Pomoči. *Uradni List Repub. Slov.* **2025**, 8836–8883.
8. Olasveengen, T.M.; Semeraro, F.; Ristagno, G.; Castren, M.; Handley, A.; Kuzovlev, A.; Monsieurs, K.G.; Raffay, V.; Smyth, M.; Soar, J.; et al. European Resuscitation Council Guidelines 2021: Basic Life Support. *Resuscitation* **2021**, *161*, 98–114, doi:10.1016/j.resuscitation.2021.02.009.
9. Mohor, M.; Strnad, M.; Baznik, Š. Priporočila SloRS Za Vzpostavitev Sistema Prvih Posredovalcev 2016.
10. Anderson, G.S.; Gaetz, M.; Statz, C. CPR Skill Retention of First Aid Attendants within the Workplace. *Prehospital Disaster Med.* **2012**, *27*, 312–318, doi:10.1017/S1049023X1200088X.

 doi:10.20944/preprints202604.0841.v1

11. Jensen, T.W.; Møller, T.P.; Viereck, S.; Roland Hansen, J.; Pedersen, T.E.; Ersbøll, A.K.; Lassen, J.F.; Folke, F.; Østergaard, D.; Lippert, F. A Nationwide Investigation of CPR Courses, Books, and Skill Retention. *Resuscitation* **2019**, *134*, 110–121, doi:10.1016/j.resuscitation.2018.10.029.
12. Lunz, D.; Brandl, A.; Lang, K.; Weiss, B.; Haneya, A.; Pühler, T.; Graf, B.M.; Zausig, Y.A. Clinical Experience Does Not Correlate with the Perceived Need for Cardiopulmonary Resuscitation Training. *J. Emerg. Med.* **2013**, *44*, 505–510, doi:10.1016/j.jemermed.2012.01.039.
13. Gugelmin-Almeida, D.; Tobase, L.; Maconochie, I.; Polastri, T.; Rodrigues Gesteira, E.C.; Williams, J. What Can Be Learned from the Literature about Intervals and Strategies for Paediatric CPR Retraining of Healthcare Professionals? A Scoping Review of Literature. *Resusc. Plus* **2022**, *12*, 100319, doi:10.1016/j.resplu.2022.100319.
14. Schmitz, G.R.; McNeilly, C.; Hoebee, S.; Blutinger, E.; Fernandez, J.; Kang, C.; Schneider, S. Cardiopulmonary Resuscitation and Skill Retention in Emergency Physicians. *Am. J. Emerg. Med.* **2021**, *41*, 179–183, doi:10.1016/j.ajem.2020.01.056.
15. Shrestha, R.; Indrasena, B.S.H.; Subedi, P.; Lamsal, D.; Moulton, C.; Aylott, J. Evaluation of Junior Doctors' Retention of Knowledge and Skills after Simulation Training in Shockable Rhythm Cardiac Arrest in a Low-Resource Setting in Nepal. *Resusc. Plus* **2023**, *15*, 100448, doi:10.1016/j.resplu.2023.100448.