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RESEARCH ARTICLE (ORIGINAL)

Attitudes and Barriers to Adherence to Advanced Life Support Training among Physicians and Nurses

Atitudes e Barreiras de Enfermeiros e Médicos na Adesão à Formação em Suporte Avançado de Vida

Actitudes y Barreras de Enfermeros y Médicos para la Adherencia a la Formación en Soporte Vital Avanzado

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Abstract
Background: Advanced Life Support is a set of procedures that significantly improves the likelihood of return of spontaneous circulation in patients with sudden cardiac arrest. Regular and up-to-date training in Advanced Life Support is strongly recommended.
Objective: To describe the attitudes of physicians and nurses toward Advanced Life Support training and to identify the barriers they experience in adhering to it.
Methodology: Observational, cross-sectional, descriptive study. Non-probability convenience sample of physicians and nurses working in Portugal.
Results: The sample composed of 476 participants expressed positive attitudes toward Advanced Life Support training. Statistically significant barriers to adherence included: high degree of difficulty (p = 0.002); lack of time (p = 0.007); difficulty managing the stress associated with the training (p = 0.015); and inadequate evaluation method (p < 0.001). Only 49.8% of the healthcare professionals had up-to-date Advanced Life Support training.
Conclusion: The percentage of professionals with up-to-date Advanced Life Support training falls short of recommended levels. Therefore, it is essential to implement strategies to promote Advanced Life Support training, with particular attention to the participants' emotional component.

Keywords: nurses; physicians; advanced cardiac life support; heart arrest; continuing education

Resumo
Enquadramento: O suporte avançado de vida (SAV) é uma metodologia com impacto positivo no retorno à circulação espontânea das vítimas de paragem cardiorrespiratória. O treino regular e a manutenção da formação atualizada em SAV são altamente recomendados.
Objetivo: Descrever as atitudes e identificar as barreiras sentidas pelos médicos e enfermeiros face à formação em SAV.
Metodologia: Estudo observacional, transversal e descritivo. Amostragem não probabilística, por conveniência, constituída por médicos e enfermeiros a exercerem funções em Portugal.
Resultados: Amostra constituída por 476 participantes, que demonstram atitudes positivas face à formação em SAV. As barreiras à adesão estatisticamente significativas foram: elevado grau de dificuldade (p = 0,002), falta de tempo (p = 0,007), dificuldade na gestão do stress inerente à formação (p = 0,015) e método de avaliação inadequado (p < 0,001). Apenas 49,8% dos profissionais tem SAV atualizado.
Conclusão: A percentagem de profissionais com SAV atualizado fica aquém do recomendado. A implementação de medidas de incentivo à formação em SAV é fundamental. A componente emocional dos participantes deve merecer especial atenção.

Palavras-chave: enfermeiras e enfermeiros; médicos; suporte avançado de vida cardíaco; parada cardiorrespiratória; educação contínua

Resumen
Marco contextual: El soporte vital avanzado (SVA) es una metodología que repercute positivamente en el retorno a la circulación espontánea de las víctimas de parada cardiorrespiratoria. Se recomienda especialmente una formación periódica y mantenerse al día con la formación en SVA.
Objetivo: Describir las actitudes e identificar las barreras que sienten los médicos y los enfermeros hacia la formación en SVA.
Metodología: Estudio observacional, transversal y descriptivo. Muestra de conveniencia no probabilística de médicos y enfermeros que trabajan en Portugal.
Resultados: Muestra compuesta por 476 participantes, que demostraron actitudes positivas hacia la formación en SVA. Las barreras estadísticamente significativas para la adherencia fueron: alto grado de dificultad (p = 0,002), falta de tiempo (p = 0,007), dificultad para gestionar el estrés inherente a la formación (p = 0,015) y método de evaluación inadecuado (p < 0,001). Solo 49,8% de los profesionales tienen ALS actualizado.
Conclusión: El porcentaje de profesionales con SVA actualizado es inferior al recomendado. Es esencial aplicar medidas para fomentar la formación en SVA. Debe prestarse especial atención al componente emocional de los participantes.

Palabras clave: enfermeras y enfermeros; médicos; soporte vital cardíaco avanzado ; paro cardíaco; educación continua

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Introduction

In the field of cardiopulmonary resuscitation, evidence shows that best practices are achieved through regular training and practice (Greif et al., 2021). The International Liaison Committee on Resuscitation (ILCOR) strongly recommends Advanced Life Support (ALS) training for healthcare professionals, as it positively influences the return of spontaneous circulation and survival rates of patients with sudden cardiac arrest (SCA; Araujo et al., 2022; Stirparo et al., 2023; Wyckoff et al., 2022).

Similarly, the European Resuscitation Council (ERC) promotes a lifelong learning approach based on frequent ALS retraining that incorporates real-life and simulated practice and evaluation moments (Perkins et al., 2021).

In Portugal, the Portuguese National Institute of Medical Emergency (INEM), through its Medical Emergency Training Department, defines, plans, and oversees medical emergency training for various stakeholders within the Portuguese Integrated Medical Emergency System (SIEM). These stakeholders include establishments, institutions, and services within the Portuguese National Health Service. INEM is also responsible for certifying and monitoring the quality of all educational products, as well as accrediting entities authorized to deliver them (Decreto-Lei nº 34/2012 do Ministério da Saúde, 2012).

One educational product certified by INEM is the ALS course, which aims to establish a universal language and methodology for managing critically ill patients and SCA victims. Focused on the ALS algorithm, the course includes theoretical lectures, workshops, and practical sessions designed to simulate real-life scenarios (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020). The course is intended for physicians and nurses, and certification is contingent upon completing both the theoretical and practical components (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020). This certification is valid for five years, after which time professionals must complete a retraining course (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020). To meet training demands, INEM trains physicians and nurses interested in this course through its regional training departments and accredited entities, including hospitals, schools, and training companies. This certification plays a vital role in promoting quality care and patient safety (Soar et al., 2021). Institutions that employ healthcare professionals, such as physicians and nurses, who care for critically ill patients, for example, in emergency departments, are mandated by law to ensure that these professionals receive ALS training (Despacho nº 10319/2014 do Ministério da Saúde, 2014).

Given that the literature review revealed no studies, either nationally or internationally, that specifically examine attitudes and barriers related to ALS training, this study will produce innovative and groundbreaking knowledge The objective of this study is to describe physicians' and nurses' attitudes toward ALS training and identify the barriers they experience in adhering to it.

Background

Consisting of a set of advanced interventions, ALS follows Basic Life Support in cardiopulmonary resuscitation (Soar et al., 2021). These interventions may include manual defibrillation, airway management, and drug administration aimed at restoring spontaneous circulation and ensuring the delivery of appropriate post-resuscitation care (Instituto Nacional de Emergência Médica & Departamento de Formação em Emergência Médica, 2020). Associated with the third and fourth links in the chain of survival, ALS is performed by qualified healthcare professionals (specifically nurses and physicians in Portugal; Instituto Nacional de Emergência Médica & Departamento de Formação em Emergência Médica, 2020).

In Europe, SCA is the third leading cause of death. According to Gräsner et al. (2021), SCA occurs at an incidence of 67 to 170 cases per 100,000 people in out-of-hospital settings, compared to 1.5 to 2.8 cases per 1,000 hospital admissions in in-hospital settings. The ALS algorithm offers a structured overview of key interventions and applies to all SCA scenarios (Soar et al., 2021). This methodology has consistently demonstrated a positive impact on the return of spontaneous circulation in patients with SCA (Soar et al., 2021; Wyckoff, Greif et al., 2022).

The first ALS course was created by the American Heart Association (AHA) in 1979 to establish and disseminate a standardized approach to treating patients with SCA (Berg et al., 2024). This methodology was later adopted across Europe and the rest of the world, forming the foundation of an emerging global consensus (Berg et al., 2024). Current guidelines are based on Consensus on Science and Treatment Recommendations (CoSTR) developed by ILCOR, which includes AHA, ERC, and equivalent bodies in Australia, Asia, and Africa (Soar et al., 2021). These guidelines are then adopted by these organizations for implementation in their respective countries (Soar et al., 2021).

In Portugal, the ALS course certified by INEM adheres to international training standards, particularly those defined by ERC, although it also recognizes certification under the AHA model. The course is structured around the ALS algorithm and comprises 16 hours of training over two days (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020). On the first day, the program includes five lectures (ALS in context, causes and prevention of SCA, acute coronary syndrome, the ALS algorithm, and post-resuscitation care), practical classes/workshops (airway management, initial approach and defibrillation, rhythm recognition, ethics and decisions not to resuscitate, and SCA in special situations), and clinical case simulations using manikins and training simulators (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020). The second day focuses on two workshops (peri-arrest dysrhythmias and blood gas analysis) and two additional practical case sessions. Trainees must complete a theoretical test consisting of 100 single-choice questions, with an approval score of at least 75% (Instituto Nacional de Emergência Médica, & Departamento de

Formação em Emergência Médica, 2020). If this score is not achieved, the trainee must retake the exam in a future edition of the course. The evaluation of practical performance will be based on the resolution of a clinical case in a simulated environment, with trainees acting as team leaders. Trainees will have two opportunities to pass the practical performance evaluation and must obtain a score higher than 15 points on the evaluation grid without committing any fatal errors. Failure results in the trainee not receiving certification (Instituto Nacional de Emergência Médica & Departamento de Formação em Emergência Médica, 2020).

In addition to the above-mentioned technical competencies, the course also addresses non-technical skills such as leadership, teamwork, task management, and interpersonal communication (Instituto Nacional de Emergência Médica, & Departamento de Formação em Emergência Médica, 2020).

There is growing recognition of the importance of evidence-based practice as the foundation of clinical practice (Orton et al., 2021). Combining professional experience with the best available scientific evidence enhances the safety, efficacy, and overall quality of health care (Pinto et al., 2023). Consequently, specialized institutions worldwide are collaborating to optimize and standardize training models for healthcare professionals providing ALS, with the goal of improving patient survival (Greif et al., 2021).

Continuing education for physicians and nurses is a critical component of this effort. A study involving nurses revealed that participants considered continuing education essential and highlighted the need for regular reinforcement of theoretical knowledge (Preto et al., 2021). Another study found that most respondents were interested in pursuing continuing education to meet their knowledge needs. However, they also mentioned several obstacles to participation, including work schedules, family responsibilities, lack of financial and training support from the employing institutions, and the cost of training (Adal & Emishaw, 2023; Silverplats et al., 2022).

Research question

What attitudes do Portuguese physicians and nurses have toward ALS training and what barriers do they encounter?

Methodology

This was an observational, cross-sectional, descriptive study with a quantitative approach. A non-probability convenience sampling method was used to recruit physicians and nurses working in Portugal. Participation was anonymous and voluntary, and participants could withdraw from the study at any time without penalty. Participants were not identified or identifiable at any point. To ensure adherence to ethical principles, each participant was required to provide informed consent by completing a section at the beginning of the questionnaire. This section included information about the study and its objectives, context, principal investigator, conditions, and funding. There were no conflicts of interest or costs incurred by the participants.

This study was approved by the Ethics Committee of the Polytechnic Institute of Viseu (Opinion No. 26/SUB/2023).

Data were collected in June of 2024 using a digital form created with EUSurvey entitled "Questionnaire on Attitudes and Barriers to Participation in ALS Training" (ABFSAV). The authors developed the questionnaire comprising three sections: I - Sociodemographic Characteristics, which included 14 questions about variables such as age, gender, education level, professional category, medical or nursing specialty, years of experience, current department, and professional association; II - ALS Training, which comprised eight closed-ended questions about participants' training in ALS; and III - Attitudes toward ALS Training and Barriers to Adhering to It, which contained 21 questions rated on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree Nor Disagree*, 4 = *Agree*, and 5 = *Strongly Agree*), through which participants expressed their level of agreement regarding their attitudes toward ALS training and barriers to adhering to it. The link to the digital survey was distributed via email and digital communication platforms.

Statistical descriptive and inferential analyses were conducted using IBM SPSS Statistics software - version 28.0. For qualitative variables, the absolute (n) and relative ($\%$) frequencies were reported for each category. For quantitative variables, the mean ($\bar{\chi}$) and standard deviation (SD) were used as measures of central tendency and dispersion, respectively, as well as the median (Mdn) and the minimum and maximum values. For proportion comparisons in qualitative variables, the p-values were obtained using the chi-square test (χ^2). For mean comparisons in quantitative variables, the p-values were obtained using the independent samples t-test. A significance level of $\alpha = 0.05$ was adopted in all hypothesis tests, and values below this threshold ($p < 0.05$) were considered statistically significant.

Due to the relatively small sample size, especially regarding physicians, the responses for all questions were dichotomized, thus creating, for each variable, two mutually exclusive categories that aggregate the responses originally dispersed across the five categories, resulting in greater representativeness. Responses from 1 to 3 ("*Strongly Disagree*" to "*Neither Agree nor Disagree*") were grouped into a single category labeled "Disagree_Neutral," and responses from 4 to 5 (*Agree* and *Strongly Agree*) were combined into a category labeled "Agree." Differences in the proportion of *Agree* responses between physicians and nurses were tested using the χ^2, which yielded the respective p-value of the test. Fisher's exact test was used when there were more than 20% of cells with expected frequencies smaller than 5, with the p-value being calculated in accordance. To account for the multiple comparisons across the 21 items, the p-values obtained were adjusted using the Benjamini-Hochberg procedure, which maintains the false discovery rate in the total number of significant

tests at 5%. This procedure controls the false discovery rate without becoming so conservative that it reduces the effectiveness of the test in detecting real effects, subsequently creating the appearance of false negatives.

Results

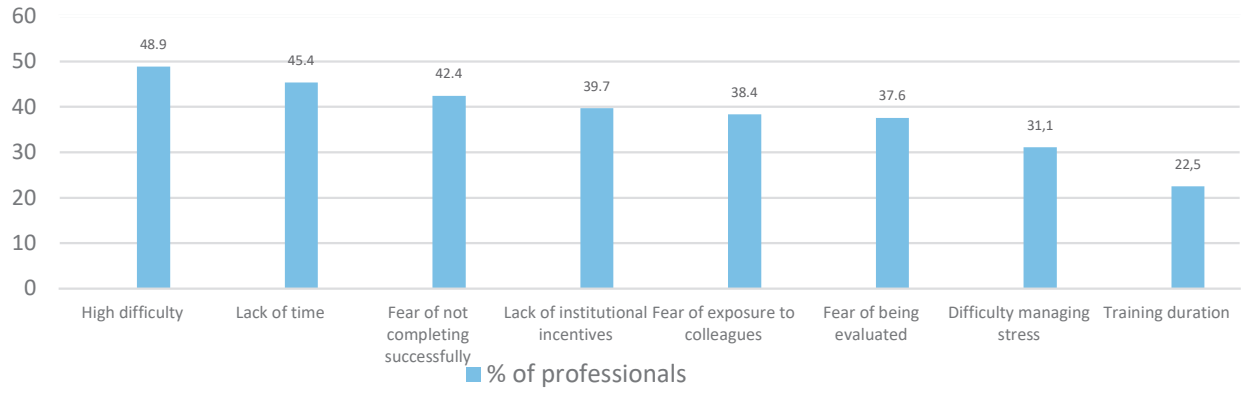
The sample included 476 participants, of whom 24.8% were physicians and 75.2% were nurses. The majority of physicians and nurses were women, with a higher percentage of female nurses (74.0%) than female physicians (66.9%), though this difference was not statistically significant ($p = 0.137$). There was a clear difference in academic qualifications between physicians and nurses, as 79.7% of physicians and only 32.7% of nurses had a master's degree. This difference was statistically significant ($p < 0.001$). On average, nurses were older than physicians ($\bar{\chi} = 40.7$ and $\bar{\chi} = 36.4$ years, respectively) and also had more professional experience ($\bar{\chi} = 17.5$ and $\bar{\chi} = 10.3$ years, respectively), both differences being statistically significant ($p < .001$).

The analysis of data collected from the questionnaire's section II – ALS training showed that physicians and nurses valued it similarly. Although only 20.8% reported that certified ALS training is mandatory in their workplace, 75.2% participated in this type of training at some point in their careers. Of those, 53.2% participated in the last five years, with 93.7% obtaining certification. This accounted for 49.8% of the total sample with up-to-date ALS training. Most participants (68.9%) said their workplace provided certified ALS training to healthcare professionals, and 60.9% pointed out that it was provided by an internal certified group. Of those who had not participated in ALS training in the last five years, 62.8% said they wanted to attend training in the future, and a significant percentage (23.3%) were undecided. Of those who responded that they intended to attend training in the future, the majority attributed an average priority to it (49.3%). Nevertheless, substantial percentages of the participants also attributed high (25.0%) and essential (17.1%) priorities to it.

Regarding the final section of the questionnaire, which aimed to analyze physicians' and nurses' attitudes toward ALS training and their perceptions of the barriers they faced, the responses of both groups were similar (i.e., the differences between them were not statistically significant), and the sample could be analyzed as a whole for these questions. Thus, taking into account the maximum median (*Mdn* = 5), 93.5% of the healthcare professionals reported that ALS training would benefit their professional development, and 79.6% considered that ALS was fundamental to their professional activities. Conversely, considering the minimum median (*Mdn* = 1), the percentages of healthcare professionals who found the content of ALS training uninteresting (0.6%) and those who did not want to participate in any training (1.3%) were low. Similarly, the percentages of healthcare professionals who believed that ALS training did not add value in the event of a SCA (2.7%) or that professional experience alone is a substitute for ALS training (3.8%) were also very low. Figure 1 presents the relative frequencies of healthcare professionals who identified a barrier to adhering to ALS training.

Figure 1

Barriers to adhering to ALS training



Significant differences were found in the attitudes and perceived barriers of physicians and nurses, both statistically and practically. For example, 17.3% of nurses considered the evaluation methods in ALS training to be inadequate, whereas only 1.7% of physicians agreed that they were adequate ($p < 0.001$). Additionally, 53.9% of nurses considered ALS training to be very difficult, a view shared by only 33.9% of physicians ($p = 0.002$). Physicians (58.5%) reported lack of time as a barrier more often than nurses (41.1%), with $p = 0.007$. Regarding the application of the ALS algorithm in cases of SCA, 70.7% of nurses felt capable, contrasting with 55.1% of physicians ($p = 0.010$). Regarding stress management, 34.6% of nurses reported difficulty managing the stress associated with ALS training, while 20.3% of physicians reported it ($p = 0.015$).

There was no significant difference in the proportion of men and women among physicians and nurses. However, the results showed that 35.8% of women reported difficulty managing the stress associated with ALS training compared to 18.9% of men (p = 0.008). Conversely, 75.8% of men felt capable of dealing with a SCA situation, compared to 63.4% of women (p = 0.042).

Simple associations were made to understand the extent to which participants with certain characteristics had valid ALS certification. It was found that 69.5% (p < 0.001) of participants who reported feeling capable of addressing a SCA situation and complying with the ALS algorithm had up-to-date ALS training. Conversely, 20.3% had certification but reported not feeling capable of doing so correctly. Among healthcare professionals working in emergency departments and intensive care units, 74.3% and 64.1%, respectively, had up-to-date ALS training. Of nurses specializing in medical-surgical nursing and medical-surgical nursing in the area of critical care, 69.9% and 85.4%, respectively, had up-to-date ALS training. Finally, of those who had up-to-date ALS training, 67.2% responded that their workplace financed their training (p < 0.001).

Discussion

This study allowed identifying the attitudes of Portuguese physicians and nurses toward ALS training and the barriers they encountered in adhering to it. Thus, the study answered its research question and fulfilled its objectives.

The study sample was obtained from two distinct populations corresponding to two professional categories: physicians and nurses. The data analysis revealed differences between the two groups in multiple demographic and socio-professional variables. Therefore, all analyses in the study took into account the separation by professional category to obtain more homogeneous and representative results of each profession's reality. Notably, all variables in this group (except gender) demonstrated statistically significant differences (at a 99.9% level) between the two professions.

However, regarding the background in ALS training, no statistically significant differences were found between physicians and nurses. This means that the two professions are homogeneous with regard to the items evaluated by that section of the questionnaire.

Although no studies on the prevalence of up-to-date ALS training (obtained within the last five years in Portugal) among healthcare professionals were found for comparison purposes, the 49.8% percentage obtained in this study is unsatisfactory, especially since guidelines strongly recommend this level of training and certification for healthcare professionals (Perkins et al., 2021). Moreover, recent studies conclude that ALS training positively impacts the return of spontaneous circulation in patients with SCA (Soar et al., 2021; Wyckoff et al., 2022) and that regular training and recertification are strongly recommended, preferably at intervals of less than five years (Araújo et al., 2022), as they are more effective than professional experience (Stirparo et al., 2023). On the other hand, data from this study indicate a positive attitude toward ALS training among professionals, as 93.5% believe that it benefits their professional development, and 79.6% consider it essential. Since 62.8% of respondents said that they wanted to attend training in the future, and, of those, the vast majority gave medium to high priority to achieving this goal, it can be deduced that a significant group of professionals – both in terms of number and personal interest/motivation – intended to attend ALS training in the near future. These results are encouraging and align with the literature (Adal & Emishaw, 2023).

Statistically significant differences were found between physicians and nurses regarding perceived barriers. These included a high degree of difficulty (p = 0.002), lack of time (p = 0.007), difficulty managing the stress associated with training (p = 0.015), and dissatisfaction with the assessment method (p < 0.001). Notably, 17.3% of nurses considered the evaluation methods in ALS training to be inadequate, whereas only 1.7% of physicians agreed. This difference was also present, although less pronounced, in the perceived level of difficulty of the ALS course. For instance, 53.9% of nurses considered the degree of difficulty to be high, a view shared by only 33.9% of physicians. Similarly, a higher percentage of nurses (34.6%) than physicians (20.3%) reported difficulty managing the stress associated with ALS training (Silverplats et al., 2022). However, a higher percentage of nurses (70.7% versus 55.1%) reported feeling capable of applying the ALS algorithm in a SCA situation. It should be noted that not all of these nurses had up-to-date ALS training.

The difference in success rates for certification between physicians and nurses was not significant (98.5% and 92%, respectively), with an overall success rate of 93.7%. These findings align with the literature, which reports success rates of 96.3% for physicians, 89.8% for nurses, and 93.1% overall (Greif et al., 2021).

Among professionals working in emergency departments and intensive care units, 74.3% and 64.1%, respectively, had up-to-date ALS training. These numbers fell short of what would be expected given that this training is mandatory for healthcare professionals who provide critical care (Despacho n.º 10319/2014 do Ministério da Saúde, 2014). The imbalance between professional categories, with 24.8% physicians and 75.2% nurses, was likely due to easier access to nurses from central Portugal, which is overrepresented at 67.3%. Although the sample percentage does not represent the national percentage, this was statistically controlled.

The results of this study should be interpreted with the following limitations in mind: the lack of national and international studies on this topic limits the ability to compare and discuss the results, and the use of a self-perception instrument may lead to underestimated or overestimated results. In addition to being non-probability, the sample presents another limitation because it is underrepresented in terms of territorial distribution, making it difficult to generalize the results. Nevertheless, despite these limitations, efforts were made to ensure a robust sample and methodological rigor.

Conclusion

This study concluded that the surveyed healthcare professionals demonstrated positive attitudes toward ALS training, recognizing its benefits for their professional development. The study also identified barriers to adhering to such training. The most frequently cited barriers were high difficulty, lack of time, fear of not completing the course, lack of institutional incentives, fear of exposure to colleagues, fear of being evaluated, and difficulty managing the stress associated with training.

The data revealed that the percentage of healthcare professionals with up-to-date ALS training falls short of the recommended level.

In terms of implications for practice, these results provide a better understanding of the attitudes of healthcare professionals toward the ALS training course as well as the barriers they perceive. They may also serve as a starting point for discussions about the course's characteristics, in order to determine whether some of its components or methodology should be changed. The frequent mention of individual barriers (e.g., fear of not completing the course, fear of exposure to colleagues, fear of being evaluated, and difficulty managing stress) underscores the need to consider the emotional impact of the course on participants. Therefore, we propose that efforts be made to develop emotional intelligence strategies, possibly including program content focused on this component. Measures to encourage ALS training should also be considered, taking into account barriers such as the lack of time and high difficulty. Institutional allocation of work time for professionals to attend training would be a decent measure that contributes to improving health outcomes, given the positive impact a trained ALS professional can have on patients with SCA.

Further studies are recommended to better understand the differences between physicians and nurses regarding ALS training courses and assess the relevance of implementing different courses for different healthcare professionals.

Due to the scarcity of existing studies in this area, further research on this topic is suggested to complement this study and enable a more comprehensive discussion of the attitudes and barriers to adherence to ALS training among physicians and nurses.

This article is based on the thesis "Attitudes and Barriers to Adherence to Advanced Life Support (ALS) Training," which was presented at the School of Health of the Polytechnic Institute of Viseu in 2023 as part of the Master's Degree in Nursing program.

Author contributions

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