Letter to the Editor

Could mobile apps improve laypeople AED use?

Sir,

In case of cardiac arrest (CA), immediate and high-quality basic life support (BLS) by bystanders is a main outcome factor. This fact, together with the simplicity of the cardiopulmonary resuscitation (CPR) and defibrillator (AED) protocols, has led to the recommendation for training all citizens in BLS.[1] In parallel, several feedback devices have been designed to help training and performance both CPR and AED. Mobile Apps have emerged as potential tools to learn and guide how to perform BLS, that are cheaper and simpler than sophisticated manikins. A recent publication reported an increase of CPR quality with the feedback provided by a Smartwatch-App[2] and two others evaluated the usefulness of Apps during CPR performance,[3,4] but no one assessed the effect of the use of mobile Apps on defibrillation time and quality by laypeople. This fact has motivated our study, which we consider could provide relevant original data.

We have selected two mobile Apps (Apple iOS): *PCEH* and *Resucitar* because these fulfil the pre-established inclusion criteria: to be free, to include the chain of survival, to indicate pads placement, to indicate execution order and to have a simple interface.

We invited first year nursing students of Santiago de Compostela University (Galicia – Spain); to voluntarily participate. The only inclusion criterion was to be naive in BLS and AED use. Sample was randomly distributed into three groups: Control, *PCEH* and *Resucitar*. Every participant was tested individually in a CA simulated scenario. AED use and performance were evaluated by means of a for the

purpose-checklist that included three main issues: defibrillation objective, safety performance and time to defibrillation.

One hundred sixteen participants, 19.5 ± 3.8 years-old were included. Groups assignment and results are shown in Table 1. Ninety (77.6%) participants accomplished the defibrillation objective and statistically significant difference was obtained when Control and Apps groups were compared. Safety during defibrillation procedure was significantly better for participants that used an App during performance than controls ($p = 0.014$). However, time to defibrillation was shorter in the Control group than in both App groups (without significant differences between Apps).

Our results show that, as simple as the use of AED is, the use of a mobile App as support might be useful in terms of effectiveness and safety during performance, but at the price of some time delay. However, all participants who were able to deliver a shock, did it in less than two minutes, a time compatible with the concept of immediate defibrillation.

In conclusion, two iOS based Apps have shown their usefulness for helping naive nurse students to effectively manage an AED in a simulated scenario. More studies should be conducted, in simulated environments with other apps and, ideally, in real patients. The design of new Apps for this purpose should take into account the current evidences and expert recommendations for AEDs use. Also, it would be ideal that Resuscitation Councils' experts checked the new Apps before to their public release.

Table 1 – AED use variables compared by App group.

	Control (n = 28)	PCEH (n = 44)	Resucitar (n = 44)	P value
Defibrillation objective, n (%)	18 (64.3)	39 (88.6)	33 (75)	0.047[a,b]
Safety, n (%)	5 (4.3)	0	3 (2.58)	0.014[a,c]
Time (s), median (IQR)	55 (42–70)	75 (64–104)	75(62–93)	<0.001[d]

Time *post hoc* analysis: Mann Whitney U test

Control vs. PCEH	Control vs. resucitar	PCEH vs. resucitar
P < 0.001	P = 0.001	P = 0.270

IQR: interquartile range.
[a] Chi squared: paired analysis.
[b] Control group vs. PCEH, p = 0.013.
[c] Control group vs. PCEH, p = 0.004.
[d] Kruskal Wallis.

Authors' contribution

All authors have contributed substantially on the conception and design the work, acquisition, analysis and interpretation of data. In addition, all of them took have been involved in drafting the manuscript and all authors have revising it critically. Finally, all authors have approved the final manuscript.

Conflict of interest

Authors have no conflict of interest related to the present study. This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

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