Smartphone applications for cardiopulmonary resuscitation: effectiveness and users' preferences

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Purpose of the study: Many mobile apps have been developed in recent years to support cardiopulmonary resuscitation (CPR) training. We carried out a randomized study to assess the effectiveness of the most downloaded apps in Italy and to evaluate trainees' preferences.

Materials and methods: CPR courses were held for 200 student nurses. Before training, four selected apps were shown; students were asked to choose their favourite app and then randomized to use only an app. Practical work was conducted on Resusci-Anne manikins with training defibrillators. Finally, instructors used the skill test form by Italian Resuscitation Council for a blind evaluation of practical abilities. The 16 items were grouped in 4 categories (A: Airways, B: Breathing, C: Circulation, D: Defibrillation) and summed in a total and four categorical scores. R program was used for statistical analysis.

Results: Respectively, each app was preferred by 14%, 10.5%, 73% and 2.5% of student nurses (chi-square uniformity test, p -value<0.0001). Regarding total scores, no significant difference was found among groups (Kruskal-Wallis test, p -value=ns). Instead, considering the 4 practical abilities, "B" skills vary with the type of app (Kruskal-Wallis test, p -value=0.001). The third app, which was preferred by most participants before training especially for its graphical presentation, gave also the best results on breath control. Apps do not affect "A", "C" and "D" skills. Scores were higher in trainees who used their favorite app (Mann-Whitney tests, p -values<0.05).

Fig 1: Grouped Box Plot showing the score of the ability "A" for each app.

Fig 2: Grouped Box Plot showing the score of the ability "B" for each app.

Fig 3: Grouped Box Plot showing the score of the ability "C" for each app.

Fig 4: Grouped Box Plot showing the score of the ability "D" for each app.

Fig 5: Grouped Box Plots comparing total Skill Test scores

Conclusions: Smartphone apps can improve CPR quality, as regards practical abilities. However, not all categories of skill test enhance in the same way. A large variability exists among apps regarding breath control. Our study suggests the importance of training with apps for which an increase of many practical skills is documented. Keeping into account users' preferences is also important for a better training process.