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Editorial

Paediatric defibrillation and the role of the layperson – Is it all in the voice?

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Every year thousands of paediatric out-of-hospital cardiac arrests (OHCA) occur, with asphyxia being the most common cause.[1,2] This is reflected in the current treatment recommendations from the International Liaison Committee on Resuscitation, which state that effective cardiopulmonary resuscitation (CPR) for paediatric patients requires ventilation in addition to chest compressions.[3–5] Once CPR with ventilations has been provided, defibrillation at 2–4 J/kg is recommended for shockable rhythms via manual defibrillator, automated external defibrillator (AED) with dose attenuator or AED without dose attenuator.[3,6]

In this issue of Resuscitation Plus, *Hansen* et al. report a simulation study to investigate the user-friendliness of three AEDs models for laypersons to use in the paediatric mode.[7] The researchers randomly assigned 90 laypeople, with no prior training, to one of the three AED models. They were informed that a child had collapsed in cardiac arrest and that it is recommended to use the AED in paediatric mode when defibrillating a child. The participants were then directed to a mannikin which resembled a 1–2-year-old child.

Rates of activation of the paediatric mode on the AED varied between the models. None of the 30 participants allocated to the AED that required the adult electrodes to be changed to child electrodes were able to activate the paediatric mode. Only 2/30 (7%) participants activated paediatric mode in the model requiring the turning of a key on the AED, while 18/30 (64%) successfully activated the paediatric mode by pushing a button on the AED. None of the AED models tested included voice prompts to active the child mode in the instructions delivered.

Pad placement in the recommended antero-posterior position for smaller children, to avoid contact and arcing between the pads,[5] was also poor (13%). The majority of participants used the adult anterior-lateral pad position, and most (86%) of these had overlapping pads. Poor pad placement has also been reported in laypersons using AEDs on adults[8,9] and even in basic life support instructors.[10] This may in part be the result of inaccurate AED pad placement diagrams supplied by some manufactures,[11,12] but again, voice prompts regarding placement in the AED models tested was poor, with only one model prompting paediatric electrode placement if the AED was in the paediatric mode.

The current scientific statement from the International Liaison Committee on Resuscitation has recognised that improving the public's awareness and willingness to use an AED is vital if we are to successfully implement public access defibrillation.[13] The impact of good BLS training should not be underestimated, as it increases the laypersons awareness of cardiac arrest and their confidence to perform CPR and use an AED.[14,15] A Chinese study by Dong et al.[16] assessed the general public's ability to operate an AED in a simulation. They found that only 18% of participants placed adult pads in the correct location before training. However, after a short 10-minute video lecture and 5-minute hands-on practice with an AED trainer and manikin, 77% of the participants were able to correctly place the pads. Better AED design is also needed to improve pad placement, for example AEDs that include detailed voice instructions have been shown to have higher rates of correct pad placement.[17]

Technological advancements may also help improve pad placement. The introduction of emergency medical services video call-guided resuscitations will help assist laypersons operating an AED and placing the defibrillation pads, especially with the increased stress levels experienced during a paediatric arrest. A recent study from South Korea by Bang et al.[18] identified a significant reduction in errors for AED operation and pad placement for video call-guided participants compared to voice call-guided and non-guided participants. Future developments in virtual and augmented reality simulation technologies may soon help improve the provision of layperson CPR and AED training, and facilitate realistic refresher training on demand.[19,20]

Technological advances on their own cannot guide a layperson who is too anxious to intervene. A Canadian study in 2020 by Sedig and colleagues, found that while the general public accepted the concept of drone delivered AEDs, the prospect of them having to provide CPR and use one caused increased anxiety.[21] However, interviews with bystanders who used an AED on a person in cardiac arrest, reveal the voice prompts provided by AEDs were useful and gave them a sense of calmness and control.[15] Voice prompts to activate paediatric mode, if needed, and for pad placement may be required in all AEDs to improve their useability in children and to save lives.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: BH is member of the Medical Research Advisory Board for Rapid Response Revival and the Advisory Board for Defibsplus Pty. Ltd. JB is funded by a National Heart Foundation of Australia Fellowship (#104751).

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