Are First Year Undergraduate Medical Students Competent in Performing Cardiopulmonary Resuscitation?

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Background, Aims and Methodology

Background

Performing high-quality cardiopulmonary resuscitation (CPR) is paramount to patient survival,[1] and the successful application of CPR knowledge and skills largely depends on the education and training the rescuers have received.[2] Medical students are expected to be proficient in basic CPR skills upon graduation,[3] and as such may be required to demonstrate the ability to deliver CPR to patients at any point during their medical degree. Similar to other Australian Medical Schools, James Cook University (JCU) requires all first year medical students to submit a certificate of completion of an Australian Credited First Aid and CPR course, from a Registered Training Organisation (RTO). Currently, no additional training or assessment of students' competence in basic CPR knowledge and skills are included in Years 1-3 of the medical curriculum, even though further activities in Years 4-6 of the course build on fundamental CPR knowledge and skills. Therefore, staff identified a potential gap in the curriculum and set out to answer the following research question:

"Does the mandatory requirement for an Australian Credited Cardiopulmonary Resuscitation (CPR) certificate negate the need for CPR training within the first year of an undergraduate medical curriculum?"

Aims

The main objective of this study was to investigate the possible need for additional CPR training within the first year of the JCU undergraduate medical curriculum. In addition, the study aimed to:

- Evaluate the confidence levels of first year medical student in CPR skills;
- Assess the competence of first year medical students in performing CPR with the use of simulation strategies; and
- Create awareness towards perceived and or actual gaps in training with regards to CPR education.

Methodology

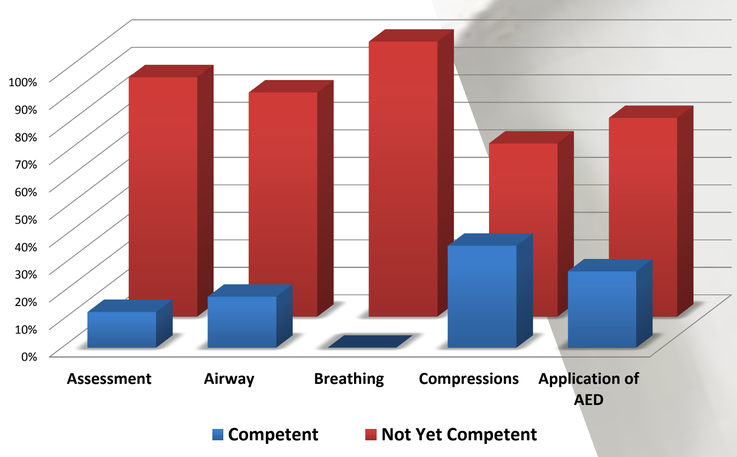
A mixed methods study was conducted to determine the confidence and competence levels of Year 1 medical students with regards to cardiopulmonary resuscitation. Listed below are the different qualitative and quantitative approaches that were utilised to best answer the research question.

- **Group Information Session:** A 50 minute information session was scheduled into the Year 1 timetable, with a twofold purpose; firstly to outline the background and aims of the project and also the structure of the Clinical Skills Activity day, and secondly to encourage student participation. Students were informed that their involvement or non-involvement in the CPR Clinical Skills Activity day had no relationship to any Year 1 assessment item and furthermore would not influence their Year 1 academic outcomes or progression in the course. This session was video recorded and made available to all Year 1 students via JCU's learning platform.
- **Questionnaire:** A 10 question survey was administered to Year 1 medical students to ascertain individual confidence levels towards their CPR skills and also their knowledge levels about CPR.
- **Assessor Information Session:** Prior to the CPR Clinical Skills Activity day, a 45 minute briefing was conducted, including a demonstration of CPR, to ensure consistency in marking.
- **CPR Clinical Skills Activity**: An observational simulation activity was conducted to assess the students' ability to perform CPR on an adult (as a first responder) using high and low fidelity mannequins. This 8 minute activity was intentionally structured to expose Year 1 medical students to the conditions imposed at the end of year clinical examinations. Students were assessed against an 18 item marking criteria adapted from the Australian Resuscitation Council (ARC) Guidelines 3,4,5,6,7 and 8.
- **Focus Groups:** Following individual participation in the CPR Clinical Skills Activity, groups of three to seven students at a time were asked to participate in a small focus group where discussions and debriefing on CPR technical proficiency and perceived confidence levels were explored.

Results

CPR PRACTICAL ACTIVITY

Figure 1: Year One medical students' assessed level of competence



Fifty-four students participated in the CPR practical activity. These students were assessed against an 18 item marking criteria which was divided into five sections to represent DRS ABCD (Figure 1). These included: Patient Assessment (3 items); Airway (3 items), Breathing (4 items); Compressions (4 items); and Application of an Automated External Defibrillator (AED) (4 items). The key findings are:

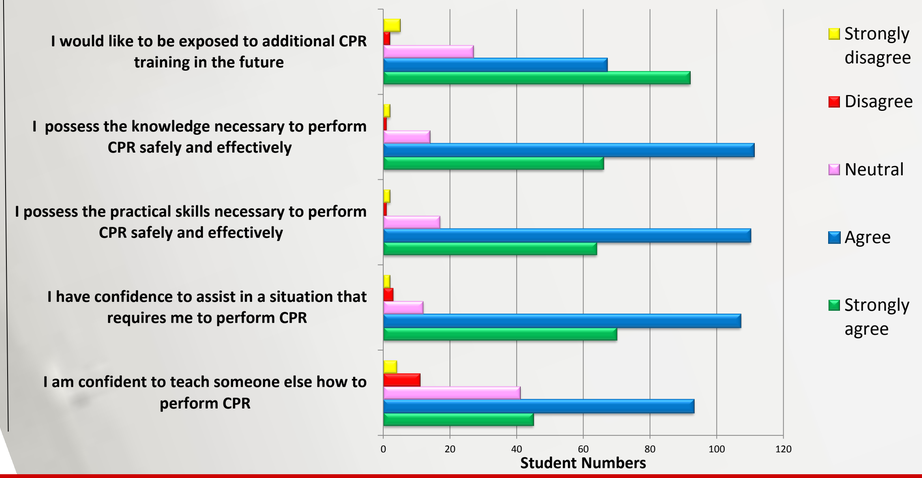
- **None of the 54 students achieved 100% competency for all items;**
- **Compressions had the best outcomes with 37% obtaining competency, followed by Application of AED with 28%;**
- **19% of students were competent in Airway and 13% were competent in Assessment; and**
- **Breathing had the poorest outcomes with none of the students achieving competency across all items of this section.**

QUESTIONNAIRES

Two hundred and sixteen students completed the 10 question survey. A summary of the results are directly below and also illustrated in Figure 2.

- **69% of students completed a CPR course 0-3 months prior to survey;**
- **Approximately 78% of students correctly answered the two knowledge questions (compressions : breaths ratio and the definition of DRS ABCD);**
- **No relationship was found between the students' perceived confidence level and answering the knowledge questions correctly (P = 0.57);**
- **When the time lapse between the course and the survey was larger (i.e. > 3 months), students were more likely to get the knowledge questions wrong (p = 0.08);**
- **79% of students agreed to additional CPR training; and**
- **Approximately 87% of students believed they had the necessary practical skills and confidence to perform CPR safely.**

Figure 2: Year One medical students' perceptions on their level of confidence, competence and knowledge in performing CPR



FOCUS GROUPS

Figure 3. Words more frequently mentioned by students in focus groups immediately following the CPR activity

The preliminary findings from the 7 focus groups (n=34) are:

- **More opportunities to practice CPR skills was verbalised by every student;**
- **The importance of one-on-one feedback to improve the students' CPR technique, in particular airway and breathing manoeuvres;**
- **Student confidence in performing CPR was directly linked to how much training they had been exposed to previously;**
- **Requests to have a timetabled clinical skills CPR teaching session, in addition to the completion of a First Aid and CPR course from a RTO; and**
- **The students support of having a CPR assessment to help drive their learning and reinforce their skills and knowledge.**

Discussion

The results of this study show that students' self-reported level of competence in CPR was greater than their actual competence. Of the 54 students participating in the practical CPR activity offered in this study, no student achieved 100% competency across all sections of the criteria. Other studies have also documented poor competency levels in CPR amongst medical students.[4,5] Students had the most difficulty when attending to the simulated patient's 'Breathing' during the practical session. The poorer outcomes in this particular area of CPR may be explained by the significant number of students who commented in the focus groups that they had not yet used a face mask, as they were instructed by the RTOs to perform mouth-to mouth resuscitation using a face shield. Similarly, 28% of students did not know how to apply an AED, with students revealing in the focus groups they had been shown an AED during their training with the RTOs, but did not get the opportunity to apply an AED. Another interesting finding was that over 40% of students who completed the CPR course over 12 months prior to the survey, answered the basic knowledge questions incorrectly. It appears that the longer the gap between training and assessment, the less likely students are to retain the relevant information. This trend, which has also been recognised in other studies,[6,7] supports the request by students to have additional training and also reinforces the importance of regular practice and revision. Finally, it seems the students' initial confidence in having the necessary practical skills to perform CPR safely was not fully supported by a practical assessment involving a simulated case scenario.

Recommendations

- **Continue mandatory requirement to submit a certificate of completion of an Australian Credited First Aid /CPR course, from an RTO**
- **Provide nominated times for students to practice CPR on low and high fidelity mannequins**
- **Introduce timetabled CPR clinical skills sessions into Year 1 undergraduate medical curriculum**
- **Introduce an assessment hurdle on CPR in Year 1 undergraduate medical curriculum**

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Ethics Approval - James Cook University, Human Research Ethics Committee H5552

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