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A randomised controlled trial of student nurse performance of cardiopulmonary resuscitation in a simulated family-witnessed resuscitation scenario

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ABSTRACT

This randomized controlled trial, conducted in a UK University nursing department, compared student nurses' performance during a simulated cardiac arrest. Eighteen teams of four students were randomly assigned to one of three scenarios: 1) no family witness; 2) a "quiet" family witness; and 3) a family witness displaying overt anxiety and distress. Each group was assessed by observers for a range of performance outcomes (e.g. calling for help, timing to starting cardiopulmonary resuscitation), and simulation manikin data on the depth and timing of three cycles of compressions. Groups without a distressed family member present performed better in the early part of the basic life support algorithm. Approximately a third of compressions assessed were of appropriate pressure. Groups with a distressed family member present were more likely to perform compressions with low pressure. Groups with no family member present were more likely to perform compressions with too much pressure. Timing of compressions was better when there was no family member present. Family presence appears to have an effect on subjectively and objectively measured performance. Further study is required to see how these findings translate into the registered nurse population, and how experience and education modify the impact of family member presence.

1. Introduction

1.1. The family witnessing context

It is now over thirty years since the first tentative steps to facilitate the presence of family members during resuscitation. The early work and evaluations have framed the themes that influenced subsequent debates, which can be identified as three core narratives (Hanson and Strawser, 1992). The first core narrative is concern for distress caused to relatives by being present, the second relates to anxiety that relatives could interfere with resuscitation attempts, and finally, the impact of being observed on health professional performance (Halm, 2005; Critchell and Marik, 2007; Chapman et al., 2012). The first two themes are briefly illustrated to set the context so that we can explore the third theme (the effect on performance) in detail.

1.2. Distress for relatives

The first narrative articulated by healthcare professionals is that being present and observing loved ones undergoing cardiopulmonary resuscitation (CPR) might be adversely distressing and harm relatives (Basol et al., 2009; Walker, 2007). Meyers et al.'s (2000) literature review identifies two themes that offer an alternative perspective. Firstly, relatives feel connected to their family member during resuscitation and derive emotional benefit if present. Even when resuscitation was unsuccessful, relatives reported that this experience helped them understand the experience and their grieving. Recently, Jabre et al.'s (2013) randomised controlled trial highlighted that family presence during CPR compared to family absence was associated with positive results for well-being against

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a criteria of psychological variables - post-traumatic stress disorder, anxiety and depression. The evidence around children undergoing resuscitation with parental presence further augments the adult-patient literature. Strong qualitative studies report that families and carers experienced great comfort and coped better with grieving having been present at their child's resuscitation (McGahey et al., 2007; Tinsley et al., 2008). The second counter-argument to professional anxiety about relatives' distress when witnessing resuscitation concerns family rights. Family members increasingly consider that they have a right to be with their family member. This reflects the shift in power between healthcare professionals and patients. Patients are moving from being passive recipients to active consumers of healthcare, with expectations of partnership working and shared decision making (Coulter and Collins, 2011; Legare and Witteman, 2013).

1.3. Interference by relatives

The second healthcare professional narrative is that family members could interfere and disrupt resuscitation (Demir, 2008; Fernandez et al., 2009). There is some evidence that nurses have experienced physical and verbal abusive, and violence from family members directed towards the resuscitation team (Koberic et al. 2010). Most of the counter-evidence draws on child and family literature, but in key studies there is no evidence to support concerns that family member presence during resuscitation hampers, interferes or prolongs the event (Nigrovic et al., 2007; Basol et al., 2009). This literature challenges healthcare professionals' key anxieties and concerns about jeopardising patient and relative well-being. There is also anxiety about potential litigation if family members witness a poor outcome (Madden and Condon, 2007; McClement et al., 2009). However, there is no evidence of increased litigation in any country so far (Jabre et al., 2013; Boyd and White, 2000).

1.4. Effect on performance

The final narrative is that family member presence has an adverse impact on professionals' performance of CPR. There is little available data on this topic and it remains relatively under-explored. In child and family studies, there is limited evidence supporting decreased performance when family members are present for invasive procedures (Basol et al., 2009). These assumptions can be assessed using simulation with planned CPR scenarios. Bjørshol et al. (2011) used simulation with paramedics to test if socio-emotional stress affected CPR quality and found no effect of stress on quality of care delivered. However, Fernandez et al. (2009) found the opposite using a simulated scenario with a second and third-year emergency medicine resident cohort. They found distressed relative presence significantly delayed the time to deliver the first defibrillation shock. This was longer for the overt reaction witness group compared with no family witness groups. The groups with the distressed relative delivered fewer total shocks compared with the no family witness groups.

Attempts to research the impact of family member presence on healthcare professional CPR performance presents big challenges. Firstly, multiple causes of cardiac arrests make it difficult to randomise subjects into comparable groups. Secondly, prediction of family member response is impossible, so family member response cannot be controlled for under experimental conditions. The same relative might be quiet and withdrawn one moment and display overt signs of grief and distress the next, making it difficult to assess family member impact on healthcare team CPR performance. Finally, levels of experience and training between clinical teams in real-time clinical practice will not be the same which prevents direct comparisons between groups. Therefore, simulation is a useful tool to test the hypothesis that family presence affects nurses performance.

1.5. Simulation in nurse education

The use of simulation in nurse education has increased in the last decade in response to concerns about improving skills acquisition and retention, and enhancing learning experiences. The aim is to be consistent with clinical needs and practice, improve patient safety and address practice placement capacity issues i.e. number and quality of available placements (Health Education Training Institute , 2014). There has been a drive in the UK to articulate the key components of simulation based education through the Framework for Technology Enhanced Learning. This recognises that simulation allows students to engage with complex practice, refine new techniques and skills, and reflect on multifaceted concepts and ideas (DH, 2011).

There is very little work examining student nurses' performance during family presence at CPR. This is an important oversight as student nurses provide a significant portion of direct care and their proximity often requires them to recognise and initiate CPR in the event of cardiac arrest (Eikeland et al., 2012). To this end, we conducted a randomised controlled trial (RCT) to explore the impact of family member presence on student nurses' performance of Basic Life Support (BLS). The trial was consistent with the simulation pedagogy at a UK university nursing department, providing a rich learning opportunity for undergraduate nursing students to practice making real-time clinical decisions in an environment that posed no risk to patients (Akhu-Zaheya et al., 2012).

2. Research design

2.1. The randomised controlled trial

A RCT was designed to assess whether family member presence had an impact on students' ability to perform Basic Life Support (BLS) tasks in keeping with their training stage. Following Fernandez et al. (2009), students were randomised to one of three simulated scenarios: (1) no family member present, (2) a quiet family member present and (3) a distressed family member present. Resuscitation training experts reviewed the scenarios for relevance and application. Teams of four students resuscitated a programmed manikin following one of the scenarios. All three manikins were programmed to deteriorate in the same way. Actors played the part of family members and were prepared in advance to be consistent in their roles. Observers were present in each scenario to record outcome data, but did not take part in any way or seek to influence student performance.

2.2. Ethics

The research team and student sample were members of the same academic institution and the study took place in dedicated timetabled teaching time. Therefore, steps were taken to prevent student coercion and to maximise the benefits of student participation. The study received approval from the Faculty Research Ethics Committee. A study team member not involved directly in student teaching briefed the students four weeks in advance. This was sufficient time for students to read the Participant Information Sheets, and raise any questions or concerns so that they could provide free and voluntary consent. Students and staff involved in the module were notified via a group email about follow-up forums for information and questions available in a virtual learning environment used for teaching. Students were informed that if they did