

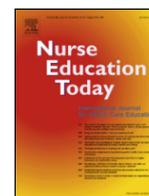


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A new approach to multi-professional end of life care training using a sequential simulation (SqS Simulation™) design: A mixed methods study

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ABSTRACT

Background: A need for improved education and training for hospital staff caring for patients in the last year of life was identified at an urban UK hospital. Sequential Simulation (SqS Simulation™) is a type of simulation that recreates a patient's journey, considering the longitudinal element of care and how this might impact on the patient's experiences, wishes and needs.

Objectives: The aim of this study was to investigate a new end of life care training intervention for multi-professional hospital staff, and its effect on their confidence in managing patients at the end of their life.

Setting/Participants: Based on the results of a formal Training Needs Analysis, four SqS Simulation™ specialty-based courses were designed for general medical and surgical multidisciplinary teams in an acute UK hospital.

Methods: Over three months, seven SqS Simulation™ sessions were attended by fifty-seven multidisciplinary healthcare professionals. A quasi-experimental mixed-methods study was conducted using open and closed-ended questionnaires, pre and post-intervention. Changes in course attendees' confidence levels were analysed and qualitative data from free-text answers informed potential reasons for any differences identified.

Results: Confidence improved for all professional cohorts ($p < 0.001$). The differences were found to be highly significant for 'doctors' ($p < 0.001$), significant for 'therapists' ($p = 0.02$) and not significant for the 'nurses' cohort ($p = 0.238$). This was explored further using a qualitative explanatory framework. Categories included: Communicating with Families; Teamwork; Goal Planning; Do Not Attempt Cardiopulmonary Resuscitation; Course Usefulness; Prior Training; and Clinical Experience.

Conclusion: This study has shown an overall improvement in confidence across disciplines after attending a SqS Simulation™ course. The differences in quantitative results between disciplines were explored through the qualitative data and revealed a difference in what the professionals gained from it. Further studies are required to assess its effectiveness in maintaining confidence of end of life care in practice, as well as its benefit to patient outcomes.

1. Introduction

End of life care is the provision of care for patients in the last year of their life and those who are close to them. The UK was

ranked first in the Economist's International Quality of Death Index, in both 2010 and 2015 (The Economist Intelligence Unit, 2015). This is further supported by findings of a 2015 UK national survey, in which 75% of bereaved relatives rated end of life care as outstanding, excellent or good (Office for National Statistics, 2015). However,

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in the same survey, relatives of those who died in hospital rated overall quality of care significantly worse than other places of death. This is particularly significant as approximately 30% of acute UK hospital admissions are in the last year of life and 50% of all UK deaths occur in hospital (Office for National Statistics, 2015; Clark et al., 2014). Inadequate end of life care in hospitals has resulted in many unresolved complaints to the Health Ombudsman (Parliamentary and Health Service Ombudsman, 2015) (final decision-makers on complaints that have not been resolved by the National Health Service and UK government departments). A 2014 national review of care of the dying in hospitals reported 'it is clear that some staff caring for dying people do not have the skills and knowledge required to deliver care to high standards' (Leadership Alliance for Care of the Dying People, 2014). Education is key in addressing deficiencies of poor communication and advance care planning, and the failure to recognise when people are dying (Parliamentary and Health Service Ombudsman, 2015; Leadership Alliance for Care of the Dying People, 2014; National Palliative and End of Life Care Partnership, 2015).

This paper describes a novel educational intervention designed specifically to address the training needs of staff caring for patients in the last year of their life at an acute London Hospital Trust. The education requirements had been formally identified using a Training Needs Analysis, which triangulated the findings of interviews with hospital staff and bereaved caregivers, with a staff survey (*End of Life Care Training Needs Assessment (Chelsea and Westminster Hospital)*, 2014). The Training Needs Analysis identified poor confidence in providing end of life care across all professional disciplines. Specifically, clinical staff reported low confidence in areas such as identifying patients at the end of life, discussing future care plans and communicating withdrawal of treatment. These outcomes align with issues identified at a national level (Clark et al., 2014; Leadership Alliance for Care of the Dying People, 2014; *End of Life Care Training Needs Assessment (Chelsea and Westminster Hospital)*, 2014).

Before the intervention was developed, a literature search was undertaken to review current practice in end of life care training across healthcare and allied healthcare professions. Papers were reviewed from the USA, Canada, Australia and the UK. The search revealed that simulation is commonly used in undergraduate end of life care education for nursing and multidisciplinary learners, and is considered more effective than classroom teaching for professional training in addressing complex areas of care and emotionally charged clinical scenarios (Gillan et al., 2014; Venkatasalu et al., 2015; Ker et al., 2003; Efstathiou and Walker, 2014; Curtis et al., 2013; Chung et al., 2016; Twigg and Lynn, 2012; Moreland et al., 2012). However, there were fewer published studies examining these methods in postgraduate end of life care education, although there was some evidence supporting the use of simulation training in improving confidence in advance care planning for doctors, nurses and social workers individually but not as a team (Bond et al., 2017; Chan et al., 2015).

Simulation has been used across a variety of healthcare settings to explore interprofessional team working over the past two decades (Efstathiou and Walker, 2014; Kneebone et al., 2002; Egenberg et al., 2007; Saylor et al., 2015). However, because this course aimed to address learning needs identified in the Training Needs Analysis around patients in the last year of life and also those imminently dying, an additional element that reflected a patient's journey over time, was required that is not addressed by traditional simulation approaches.

Sequential Simulation (SqS Simulation™) is a relatively new concept and comprises the physical re-enactment of connected components of care. In SqS Simulation™, simulation scenarios are designed to represent the longitudinal aspect of a patient's care pathway, thus

putting the perspective of the patient at the core, rather than clinicians, disciplines, settings or specialities. There are several studies that explore and evaluate its use in a variety of healthcare pathways, and more recently a conceptual and process model has been developed based on theoretical and empirical evidence (Weldon et al., 2016a; Weldon et al., 2016b; Huddy et al., 2016; Kneebone et al., 2016; Powell et al., 2016; Weldon et al., 2015; Weldon et al., 2018). To date there are no studies that investigate an SqS Simulation™ design for end of life care training.

The SqS Simulation™ course was designed to improve healthcare professionals' confidence in providing end of life care both as an individual healthcare provider and as part of a multidisciplinary clinical team. The course aimed to demonstrate how a patient's experiences, wishes and care needs might change as their condition deteriorates, and how clinical decision-making and communication could impact on these experiences over time.

The multi-professional SqS Simulation™ course intervention is the focus of this paper. Given the course's aim, of improving the confidence of healthcare professionals and multidisciplinary teams undertaking end of life care, through training in communication and collaborative planning, the study aimed to assess the course's effectiveness in improving confidence, and to explore the factors influencing this.

2. Methods

2.1. Ethics Statement

Ethical approval was obtained from the Imperial College Research Ethics Committee (ICREC – Reference: 14IC2251). Informed written consent was obtained from all participants.

2.1.1. SqS Simulation™ Course Design

Four courses were developed in collaboration with clinical specialists, alongside a multidisciplinary end of life care education steering group. The courses were built around experiences of hospital inpatients living with common severe life-limiting conditions: chronic obstructive pulmonary disease; Stroke; Small Bowel Obstruction (Surgical Management); and Liver Failure (Table 1).

The simulation scenarios were developed iteratively drawing on SqS Simulation™ conceptual and process models (which guide the user through each step and consideration in the development of the simulation goals and outcomes, scenarios, structure, participation and administration); experts in simulation; clinical specialists; and the multidisciplinary team end of life care education steering group (Fig. 1).

Each course comprised a half-day programme with three simulation scenarios that ran consecutively, designed to illustrate the longitudinal characteristics associated with end of life care over time, and to represent a patient's journey in hospital towards the end of their life (Fig. 2). Scenarios were followed by debriefs to support reflective discussion and learning. Debrief has been identified as the key site for learning in simulation and therefore is an important design consideration (Fanning and Gaba, 2017; Bradley and Postelthwaite, 2013).

Two multi-professional teams attended each half-day course. Attendees each undertook two of the three scenarios in groups of four to six. Both teams undertook scenario one simultaneously, then each team undertook one of either scenario two or scenario three whilst the other group observed. This was an important aspect, ensuring the observing team were aware of the clinical decisions made in the context presented, and how that would affect their own decisions as well as impact on the patient, an aspect that occurs regularly in clinical practice.

Table 1
Example scenario (chronic obstructive pulmonary disease).

<p>Patient Demographics: Patient ID: Mrs Price Gender: F DoB: 12th July 1956 Age: 72 years Social history: Lives with husband/wife, needs help dressing and washing. Sleeps in chair as has not climbed stairs for years. Still smoking, 2 packets cigarettes/day for 54 years Enjoys a whisky at the weekends. Medical History: Known severe COPD; Arthritis, Mild angina; Indigestion; Minimum exercise tolerance; Atrial Fibrillation</p>	
<p>Day 6</p>	<p>Day 14</p>
<p>Synopsis: Admitted to hospital 6 days ago with acute exacerbation of COPD. 4th Admission in 12 months. Last admission was prolonged and involved ITU admission with 3 month respiratory wean. Went home but readmitted after 6 weeks with worsening shortness of breath and cough productive of green sputum. Has always had ankle swelling but this has got worse recently and can't do up shoes. Has had some weight loss (approx. 6 kg in last 6 months). Completed a pulmonary rehab programme 18 months ago. Current Clinical Setting: Respiratory ward</p>	<p>Synopsis: Despite a week of antibiotics and other respiratory care on the respiratory ward, the patient become more breathless and drowsy and was therefore started on NIV 2 days ago. Patient requiring multiple ABGs and now refusing. NOK want patient to go to ITU. The patient says she's had enough, and no longer accepting chest physio input. Managed to sit out in the chair this morning, but tired very quickly and back in bed now. There has been no clear improvement in the patient's clinical condition since NIV started. Beginning to get pressure areas which are red from the NIV, urinary catheter is causing discomfort, and IV access has been increasingly difficult to obtain. Not eaten or drunk more than a few sips in the last 2 days. Has been getting quite distressed and confused at night time and tries to take her mask off. Husband has been at the patient's side most of the last 2 days. They stayed late last night and are clearly very stressed and tired. They are happy for team to discuss care with their daughter. Clinical Setting Level 1 - Acute Admissions Unit (High Dependency)</p>
<p>Learning Objectives:</p> <ol style="list-style-type: none"> 1. Improved confidence and ability in identifying adult patients in the last year of life 2. Improved confidence and ability in making decisions about treatment (including setting ceilings of care and DNACPR) and improved understanding about advanced care planning. 3. Improved communication with patients, relatives and staff colleagues around these decisions 	

Goals & Outcomes

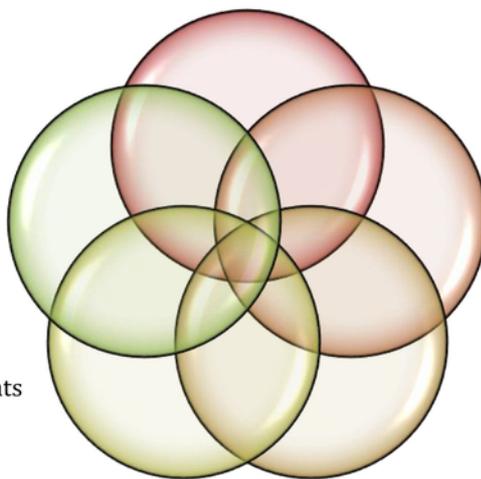
- Training goals
- Sequential Simulation purpose

Scenarios

- Evidence base
- Multiple scenarios
- Design detail
- Fidelity
- Design consensus

Participation

- Simulation participants



Structure

- Framing and scenario structure
- Structure of feedback
- Space, layout and sound
- Set considerations

Administration

- Administrative tasks
- Ethics and Evaluation
- Workshop structure

Fig. 1. SqS Simulation™ training conceptual model.

A multidisciplinary faculty was assembled with a total of three facilitators (senior doctors, nurses and therapists) in attendance during sessions with designated roles according to skill sets and experience in leading simulation debriefs. One actor (for economic reasons to keep the course costs low and thus sustainable) was employed to play the role of the patient in one scenario and the patient's relative in the following scenario. Props were used to distinguish the actor's role as either patient or relative (e.g. change in clothing, glasses, hair). The course was carried out on hospital premises with the use of a simulation laboratory, observation room, equipment and props.

2.1.2. Research Aim

The research aimed to investigate the training programme's effectiveness in improving the confidence of healthcare professionals and multidisciplinary teams undertaking end of life care whilst allowing potential reasons for any changes to emerge. To achieve this, a quasi-experimental (single-group pre-test, post-test) mixed-methods (quantitative and qualitative data) design was conducted.

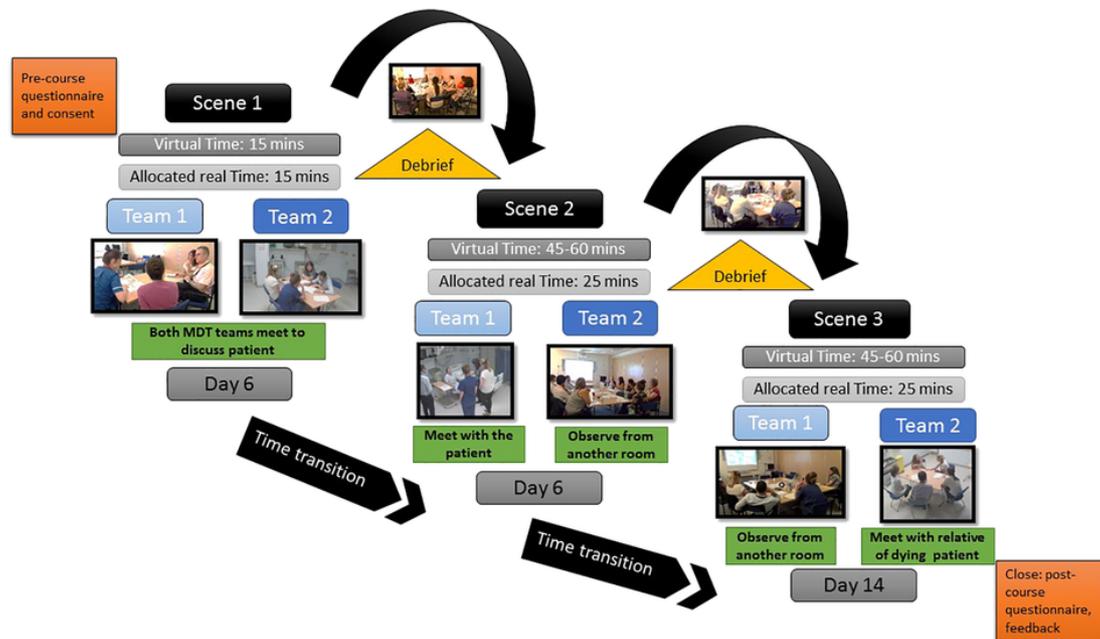


Fig. 2. SqS Simulation™ scene and time allocation.

2.1.3. Sample

Seven 3.5h sessions were run with a total of 57 attendees between May and July 2016. The course was attended by 26 doctors (15 consultants, 11 registrars), 14 nurses and 17 therapists. Attendees were allocated to multidisciplinary groups. Where possible the teams comprised real ward-based multidisciplinary team's. Attendance was voluntary but encouraged by senior members of staff.

2.1.4. Questionnaire Design

Questionnaires (see appendix 1) comprised pre and post course confidence assessments including six questions taken from the American validated questionnaire, addressing confidence in five domains (Lazenby et al., 2012). The post-course questionnaire also included open and closed evaluation questions for feedback on the course design. Questions were adapted to address differences in terminology and relevance to the course content. Questionnaires were anonymised, but demographic data including course date, healthcare discipline and role level were collected.

2.1.5. Quantitative Analysis

Pre and post-course questionnaires were participant matched (by stapling pre and post questionnaires together and asking participants to fill out the first page at the beginning of the course and the second page at the end) to enable paired analysis. SPSS software was utilised for quantitative data analysis (IBM Corp, 2013). Three authors concurrently inputted and checked the data for consistency (SMW, AW & BW). Descriptive statistics were used for the participant demographic data. Inferential statistics enabled the analysis between the pre and post confidence scales, as well as between professional roles.

The data was not normally distributed, and therefore a non-parametric test (The Wilcoxon Signed Rank test) was applied to analyse the difference between the pre and post questionnaire answers for each of the six individual questions according to a discipline-specific cohort ('combined professionals', 'doctors', 'nurses', 'therapists').

Bonferroni correction was applied to adjust for multiple statistical comparisons. The null hypothesis 'there is no difference in confidence level pre and post simulation training programme' was used.

2.1.6. Qualitative Analysis

To understand more about the impact of the course on attendees' confidence identified by the quantitative data, qualitative data analysis of the free text responses to the ten questions in the "Course Feedback" section of the post-course questionnaire was undertaken using eight categories (Table 2). This provided an explanatory framework to analyse the free text responses in the feedback section of the questionnaires.

Thematic analysis was then used to identify themes which emerged from the data within the categories. Two researchers (A.W & B.W) coded the data into the framework separately. Four researchers (A.W, B-W, S-M.W & MK) compared the findings and came to a consensus on any discrepancies.

3. Results

3.1. Quantitative

Table 3 displays the median Likert scores for each question in both pre-course and post-course questionnaires for all professionals who attended the course. There was a significant to highly significant increase in self-reported confidence in all questions apart from question 1 which did not demonstrate a significant difference. For 'all professionals' the difference was highly significant ($p < 0.001$).

Table 4 displays the pre and post-course self-reported Likert scores grouped according to the professional discipline of nurse, doctor and therapist respectively. There was no significant difference in the scoring for the 17 nurses who attended the course. The cohort of 26 doctors demonstrated a significant increase in their scores for questions 3,5 and 6, whilst the 14 therapists had a significant improvement in confidence scores for questions 2 and 4. The other questions showed no significance in the difference between pre and post-courses questionnaire scores. For individual disciplines, the differences were found to be highly significant for the 'doctor' cohort ($p < 0.001$), significant for the 'therapist' cohort ($p = 0.02$) and not significant for the 'nurse' cohort ($p = 0.238$).

Table 2
Questions generated from quantitative data.

Question generated from results of the quantitative analysis of pre- and post- course confidence assessment	Category derived from the quantitative analysis
In exploring why there was no significant difference in confidence in the 'combined professionals' group regarding 'helping families accept a poor prognosis': What were the attendees' comments with respect to communicating with families?	Communicating with families
In exploring why there were significant differences in confidence for both the 'doctors' and 'combined professionals' groups regarding talking with other professionals about patients in the last year of life and care of the dying patient: Did the attendees find the teamwork elements of the course useful?	Teamwork
In exploring the improvement in confidence in setting goals for patients for 'combined professionals' and for 'doctors': Did attendees make any comments on advance care planning?	Goal planning
In exploring the lack of significant difference in confidence for 'doctors', in relation to the significant difference for 'combined professionals' regarding starting and participating in CPR conversation: What comments were made regarding DNACPR (particularly from doctors)?	DNACPR
In exploring the lack of significant difference in confidence for the 'nurses' group regarding all questions: Did comments reveal any prior training that might have influenced the nurses' perceptions?	Prior training
In exploring the low pre-course confidence scores for the 'therapists' group regarding providing EOLC: Did attendees' comments indicate limited clinical experience for therapists in this area?	Clinical experience
In exploring the lack of significant difference in confidence for the 'nurses' and 'therapists' groups compared to the significant differences for the 'combined professionals' group regarding the course overall: What are the attitudes towards the course and do comments reflect the usefulness of the course (particularly for nurses and therapists)?	Course usefulness

3.2. Qualitative

3.2.1. Communicating with Families

The median difference of the 'combined professionals' pre and post-course answers to question 1 ('I feel comfortable helping families accept a poor prognosis') was found to be not significant [$p = 0.078$] (Table 3). The qualitative data was explored to find explanations for why the course had not impacted positively on confidence with regards to the derived category 'communicating with families'. The majority of responses praised the course for its approach in helping them to communicate with families, for example, "I feel more confident in approaching those conversations with relatives and patients". It was therefore not possible to draw any conclusions from attendees' comments.

Table 3
Self-reported confidence all professionals.

Pre-question	Median (SD)	Mean CI's	Paired post-question	Median (SD)	Mean CI's	Missing answers	P-value (2-sided)	P-value adjusted *
1	3 (0.9)	2.4, 2.9	PostQ1	3 (0.7)	2.6, 3.0	6	0.013	0.078
2	3 (0.8)	2.3, 2.8	PostQ2	3 (0.6)	2.9, 3.2	5	0.000	0.000
3	2 (0.8)	2.2, 2.6	PostQ3	3 (0.7)	2.7, 3.1	6	0.000	0.000
4	3 (1.3)	1.9, 2.6	PostQ4	3 (1.1)	2.4, 2.9	7	0.000	0.000
5	3 (0.8)	2.8, 3.3	PostQ5	4 (0.6)	3.4, 3.7	5	0.000	0.000
6	3 (0.7)	2.8, 3.3	PostQ6	4 (0.6)	3.3, 3.6	5	0.001	0.006

* Original p value multiplied by 6 for Bonferroni multiple comparisons.

3.2.2. Teamwork

The median difference of the 'combined professionals' pre and post-course answers to question 5 was found to be highly significant ($p < 0.001$), and for question 6 was found to be significant ($p = 0.006$) (see Table 3). For the 'doctors' group, there was a significant difference for both question 5 and question 6 ($p = 0.006$) (See Table 4). The category of Teamwork was therefore derived (Table 2). 23 pieces of data were categorised, and six themes emerged including Openness; Different Perspectives; Supportiveness; Observing Others; Generic Discussions and Effect on Future Teamwork.

The theme 'Openness' emerged mainly from doctor responses as this consultant's response describes: "The ability to discuss amongst colleagues our own difficulties and hearing theirs". 'Different Perspectives' was a category that emerged for all cohorts; one registrar wrote: "Very useful having views/opinions of multidisciplinary team members as well as actor's perspectives as often very medical led". 'Supportiveness' emerged from one doctor's response and 'Observing Others' was a category that emerged for all cohorts excluding 'nurses'; one therapist wrote: "It was excellent to see how each of the multidisciplinary team approach a situation" and a consultant explained that the following was useful for them: "The debrief and watching others manage communication". All cohorts generated a 'Generic Discussions' sub-category and 'Effect on Future Teamwork' emerged from one therapist's feedback: "I hope to be more confident in my ability to recognise end of life situations using the framework and hope I will become more confident addressing my concerns with the medical team."

3.2.3. Goal Planning

The median difference of the 'combined professionals' pre and post-course answers to question 3 was found to be highly significant [$p < 0.001$] (See Table 3), and for the 'doctors' group the difference was significant [$p = 0.006$] (See Table 4). The category of Goal Planning was therefore derived (Table 2). This was to explore the possible reasons why there had been a significant difference in the 'doctors' and 'combined professionals' cohorts in the pre- and post-course median Likert scores for Question 3, "I am able to set goals for care with patients and families". 13 pieces of data generated five themes relating to specific aspects of goal planning which were: Recognise End of Life; Participating in Goal Planning; Using Documented end of life Decisions; Prioritise Time; and Content of Goal Planning Discussion.

With regards to the theme 'Recognising end of life' one doctor commented: "Can use the prognostic indicators to help families understand why we have identified their relative as end of life". 'Prioritising Time' was another theme as described here by a consultant "Reaffirms my belief of the importance of end of life care planning. Aim to increase potential for discussion at earlier stage in outpatient clinic". The course was perceived by some to have had a positive impact on 'Participating in Goal Planning'; a therapist wrote "good to make me think about my role in recognising dying patients and advance care planning" and another "I feel more confident in approaching those conversations

Table 4
Self-reported confidence for each professional group.

Pre-question	Median (SD)	Mean CI's	Paired post-question	Median (SD)	Mean CI's	Missing answers	P-value (2-sided)	P-value adjusted *
Nurses self-reported confidence, n = 17								
1	3(0.4)	2.8, 3.3	PostQ1	3(0.5)	2.8, 3.5	3	0.564	3.384
2	3(0.9)	2.2, 3.1	PostQ2	3(0.8)	2.8, 3.7	3	0.053	0.318
3	3(0.7)	2.4, 3.1	PostQ3	3(0.6)	2.5, 3.1	3	0.564	3.384
4	3(1.1)	1.8, 2.9	PostQ4	3(0.7)	2.6, 3.4	3	0.014	0.084
5	3(0.9)	2.6, 3.5	PostQ5	4(0.7)	3.1, 3.9	3	0.102	0.612
6	3(0.5)	3.1, 3.5	PostQ6	3.5(0.6)	3.1, 3.8	3	0.705	4.230
Doctors (consultants and registrars) self-reported confidence, n = 26								
1	3(0.6)	2.6, 3.1	PostQ1	3(0.7)	2.6, 3.2	3	0.317	1.902
2	3(0.7)	2.5, 3.0	PostQ2	3(0.6)	2.8, 3.3	2	0.013	0.078
3	3(0.6)	2.3, 2.7	PostQ3	3(0.5)	3.0, 3.4	3	0.001	0.006
4	3(0.5)	2.0, 3.4	PostQ4	3(0.5)	3.0, 3.4	3	0.366	2.196
5	3(0.6)	2.9, 3.4	PostQ5	4(0.5)	3.4, 3.8	2	0.001	0.006
6	3(0.6)	2.9, 3.4	PostQ6	4(0.5)	3.3, 3.8	2	0.001	0.006
Therapist self-reported confidence, n = 14								
1	2(1.1)	1.0, 2.3	PostQ1	2(0.8)	1.9, 2.8	0	0.021	0.126
2	2(0.9)	1.5, 2.6	PostQ2	3(0.5)	2.7, 3.2	0	0.002	0.012
3	2(1.1)	1.3, 2.5	PostQ3	3(1.0)	1.9, 3.1	0	0.011	0.066
4	0(1.1)	0.0, 1.3	PostQ4	1(0.9)	0.8, 1.9	0	0.004	0.024
5	3(0.9)	2.3, 3.4	PostQ5	4(0.7)	3.1, 3.9	0	0.030	0.180
6	3(1.0)	2.1, 3.3	PostQ6	4(0.8)	2.9, 3.8	0	0.059	0.354

* Original p value multiplied by 6 for Bonferroni multiple comparisons.

with relatives and patients". However, one physiotherapist felt they could have been more engaged "Perhaps if including therapists, to have a separate scenario that addresses poor functional prognosis to challenge therapists further".

3.3. Do Not Attempt Cardiopulmonary Resuscitation

The difference in confidence indicated by responses to the pre- and post-course question 4 "I felt comfortable starting and participating in discussions about Cardiopulmonary Resuscitation status" was found to be not significant in the 'doctors' group ($p = 0.366$), despite being highly significant in the 'combined professionals' group ($p < 0.001$) (Tables 3,4). The derived question explored why the course had not impacted on confidence for the 'doctors' group (Table 2).

No doctors commented on 'Do Not Attempt Cardiopulmonary Resuscitation'. The qualitative data is, therefore, unable to help answer this question and feelings towards the quality of teaching on this subject was varied. One nurse wrote that they enjoyed "Discussion around the signing of do not resuscitate forms and if they are valid without consultant signatures + for how long" however, a therapist on a different date commented "Could actually establish clear + consistent ways to discuss do not attempt cardiopulmonary resuscitation + ceilings of care decisions. Lots of discussions but little overall conclusion".

3.3.1. Prior Training

The nurse cohort demonstrated no significant difference between any of the paired questions. There is a suggestion in the literature that that nurses, particularly as undergraduates, may have been exposed to more end of life care training than other disciplines (Moreland et al., 2012; Smith-Stoner, 2009; Hamilton, 2010; Sperlazza and Cangelosi, 2009; Fabro et al., 2014). The category 'Prior Training' evolved to understand further whether this had influenced nurses' perceptions of the course's usefulness. 16 pieces of data were allocated to this category with four themes: 'Simulation Training', 'Communication', 'Multidisciplinary Team Approach' and 'End of Life Care Training'. It was difficult to ascertain whether cohorts had experience of end of life care training or of simulation as a training method, due to the ambiguity of the responses. With reference to limited prior experience in simulation training, one nurse said: "I have only ever been involved in one scenario-based learning. I

found I learnt more because the situation felt so realistic and very similar to previous situations I have been in". One registrar alluded to having been on previous simulation courses but not end of life care training: "First ever sim for end of life care - an excellent experience and there is a great need for this as it's so important and we do this everyday". However, across cohorts, there was a mixed response in terms of any prior training.

3.3.2. Clinical Experience

For therapists, the median scores for questions 1 and 4 were 1.5 and 0, compared with median scores for both the 'nurses' and 'doctors' groups of 3 and 3 respectively (Table 4). These low confidence scores suggest that this cohort was likely to have the least experience with managing end of life, and limited training which is also reflected in the literature (Chung et al., 2016; Brown-Saltzman et al., 2010). A question was therefore generated which gave rise to the 'Clinical Experience' category (Table 2). Only four pieces of data were allocated to this category, and no distinct themes emerged. One therapist wrote, "I find it difficult in these scenarios when called out in the middle of the night for a rapidly deteriorating patient who may be reaching end of life." This implies a degree of prior clinical experience, however, given the paucity of data and range of experience level in the therapy cohort, it was not possible to fully address this question.

3.3.3. Course Usefulness

For the 'combined professionals' group, all questions except question 1 reflected a significant ($p < 0.001$) increase in median Likert scores (Table 3). However, for the 'nurses' and 'therapists' groups, this was not the case (Tables 4). For the 'nurses' all responses reflected no significant increase in confidence and for the 'therapists', most questions (1, 3, 5, 6, and). A question was therefore derived to explore this (Table 2).

Eight themes emerged within this category, including 'Learning from Watching others Practice'; 'Usefulness of Application'; 'Multidisciplinary Team Approach'; 'Praise'; 'Realism' and the Impact on Learning'; 'Discussion'; 'Reflection on Clinical Practice'; and 'Opportunity for Personal Exploration/Sharing'.

The largest theme was the 'Reflection on Clinical Practice' as seen in these comments by nurses: "The simulations. A lot of reminders of why I am a nurse!" and "Useful to see how ambiguity hinders conver-

sations - patients reaching conclusions” which demonstrates the degree of reflective learning on-going directly following the course. All cohorts found the discussion elements, learning from watching others, the Multidisciplinary Team approach, and an opportunity for personal exploration/sharing as useful. The second largest theme was ‘Usefulness of Application’ which revealed a particular focus on teams. One consultant commented “Should be available for all healthcare workers coming into contact with patients”.

The theme of ‘Opportunity for Personal Exploration/Sharing’ included comments around “Ability to discuss my fears of situations that arise that I don't normally discuss” (Consultant) and “Have not had the opportunity to reflect on the most common serious conversation I have as a professional for many years” (Consultant).

4. Discussion

There was a statistically significant improvement in self-reported confidence for all professionals when comparing pre and post-test scores. Between the individual disciplines, the differences were found to be highly significant for the ‘doctors’, significant for the ‘therapists’ and not significant for the ‘nurse’ cohort. These variations may reflect smaller numbers in the last two groups but may also represent a difference between these professional disciplines and of their level of involvement in the simulation scenarios.

Qualitative analysis was performed to explore questions that arose from the quantitative results. With regards to the teamwork aspect of the course, all disciplines found ‘observing others’, ‘different perspectives’ and ‘generic discussions’ valuable. Feedback from doctors suggests that the ‘openness and supportiveness’ of teamwork allowed them to feel more comfortable when talking with other professionals, which did not emerge as a theme from the other cohorts. It is possible that the doctors are less used to open discussions because of expectations (both perceived and real) of their role as decision-makers. The results indicate that this was a key benefit perceived by doctors on this training programme.

There was an improvement in confidence across all cohorts in setting goals for care with patients and families. Doctors' comments related to specific things that they had learned from the course that they would take forward to improve their practice. For example, “Can use the prognostic indicators to help families understand why we have identified their relative as end of life”. Comments from the other disciplines at times reflected a shift in perspective and a new recognition of their role in discussing goals for care “Good to make me think about my role in recognising dying patients and advance care planning”.

4.1. Limitations

This study was conducted in a single institution, and therefore, although multi-professional and multi-specialty, the results may not be generalizable to other hospitals or other settings. The sample size was adequate for analysis of change in confidence for ‘all professionals’ but too small for any meaningful analysis to be made between disciplines and experience level. Participation was also voluntary and due to this the team composition did not always reflect real life teams. The qualitative data was drawn from free-text questionnaire responses and therefore the depth of the thematic analysis was limited.

5. Conclusion

Overall, this study has shown a benefit across disciplines in the use of SqS Simulation™ for training in identifying and planning care at the end of life. The study demonstrated both the effectiveness of

the intervention on multidisciplinary team's confidence in end of life care in the acute hospital setting and explored the reasons for this, generating further knowledge on the course's benefit.

This paper adds to existing research in describing a novel SqS Simulation™ course for end of life care education that engages with the reality of multi-professional team working. This is the first time that this unique approach to multidisciplinary team training has been used and studied in the end of life care context.

Further studies of this approach are required to assess its effectiveness in maintaining multidisciplinary team confidence of end of life care in practice, as well as its benefit to patient outcomes. Other studies should focus on iteratively improving the design to meet the needs of all professional groups, at all experience levels.

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Declarations of Interest

None.

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Ethics Statement

Ethical approval was obtained from the Imperial College Research Ethics Committee (ICREC – Reference: 14IC2251). Informed written consent was obtained from all participants.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.nedt.2018.08.022>.

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