Aims

To report the results of a randomised controlled trial which explored the effectiveness of clinical simulation in improving the clinical performance of recognising and managing an adult deteriorating patient in hospital.

Background

There is evidence that final year undergraduate nurses may lack the knowledge, clinical skills and situation awareness required to competently manage a deteriorating patient in hospital. The effectiveness of clinical simulation as an educational strategy to teach the skills required to recognise and effectively manage the early signs of clinical deterioration needs to be evaluated.

Method

This was a two centre, randomised, controlled trial with single blinded assessments. Data were collected in July 2013. Ninety- eight first year nursing students were randomised either into a control group where they received a traditional classroom lecture, or an intervention group where they received simulation training. Participants completed a pre and post- intervention objective structured clinical examination. General Perceived Self Efficacy and Self-Reported Competency scores were measured before and after the intervention. Student satisfaction with teaching was surveyed after the teaching intervention.

Results

The intervention group performed significantly better in the objective structured clinical examination after their simulation training. General Perceived Self Efficacy and Self-Reported Competency were not correlated with performance. There was no significant difference in the post intervention General Perceived Self Efficacy and Self-Reported Competency scores between the control and intervention group. The intervention group were significantly more satisfied with their teaching method.

Conclusion

Simulation based education may be an effective educational strategy to teach nurses the necessary skills to effectively recognise and manage a deteriorating patient.

Summary Statement

Why is this research or review needed?

- Poor patient outcomes, avoidable ICU admissions and death may result from delayed assessment and management of the deteriorating adult patient.
- Registered nurses may not possess the necessary knowledge, skills and situational awareness to manage the deteriorating patient in a timely manner
- The effectiveness of clinical simulation as an educational strategy to teach the skills required to recognise and effectively manage the early signs of clinical deterioration needs to be evaluated.

What are the key findings?

- Simulation training lead to a significantly better systematic performance of an ABCDE assessment and management of the deteriorating patient.
- The improvement in General Perceived Self Efficacy and Self-Reported Competency in the group who had simulation training was not significantly different to the group who had traditional classroom teaching.
- The group who received simulation training were significantly more satisfied with their teaching.

How should the findings be used to influence policy/ practice/ research/ education?

- Health education institutes and healthcare settings, both of whom have a responsibility to ensure that nurses may effectively recognise and manage a deteriorating patient, should consider adopting clinical simulation as an effective educational strategy
- Continued investment into the resources required to provide effective clinical simulation is worthwhile
- Further research into the retention of knowledge and skills and the transfer of this knowledge and skill into clinical practice is required.

Key words

Patient deterioration

Patient simulation

Randomised controlled trial

Nursing Education

Critical Illness

Self-efficacy

Clinical performance

Introduction

Recognising and managing the deteriorating patient has been high on the international patient safety agenda as delayed assessment and mismanagement of clinically deteriorating patients is associated with poor patient outcomes, and avoidable ICU admissions and deaths (National Institute for Health and Care Excellence (NICE) 2007, DeVita *et al.* 2010, Buykx *et al.* 2011). Effective early recognition and response to patient deterioration may directly impact patient mortality, therefore nurse educators require an effective educational strategy to arm nurses with the necessary skills to effectively recognise and respond to patient deterioration. In particular there is an expectation from employers, professional bodies and health care consumers alike that graduate nurses are 'work-ready' and may function optimally in the clinical setting where patient deterioration may occur at any time (Larew *et al.* 2006, Bambini *et al.* 2009, Kelly *et al.* 2014). However, it is evident that the early signs of clinical deterioration are not always being recognized in a timely manner (Endacott *et al.* 2010, Kelly *et al.* 2014). Bogossian *et al.* (2014) in a multicentre study evaluating final year undergraduate nursing student's performance in recognising and responding to sudden patient deterioration revealed that participants lacked the knowledge, clinical skills, team work and situation awareness required to competently manage a deteriorating patient. Situation awareness is deemed critical in timely clinical decision-making, appropriate management and quality patient care outcomes (McKenna *et al.* 2014). Situation awareness may be described as a comprehensive understanding of the environmental, spatial and time factors in the immediate vicinity which may affect information flow, the achievement of goals and decision making. McKenna *et al.* (2014) also found, in situation awareness to be low in students managing simulated patient deterioration.

Higher education institutes and practice areas have been charged with ensuring that future nurses develop and maintain competencies in recognising the early warning signs of clinical deterioration, timely escalation and effective clinical decision making (Endacott *et al.* 2010; Bogossian *et al.* 2014). Many higher educational institutes have adopted clinical simulation as an educational strategy to teach such clinical competencies to undergraduate nursing students (Ricketts 2011). The purpose of this study is to evaluate the effectiveness of clinical simulation as an educational strategy to teach the early recognition and effective response to the deteriorating patient.

Background

Clinical simulation attempts to replicate the essential aspects of a clinical situation (Buckley & Gordon 2011). There has been an increased trend in using clinical simulation in both undergraduate and post graduate nurse education (Alinier *et al.* 2006). Clinical simulation may be delivered using

different modalities such as actors, standardised patients role play scenarios mannequins (Bearnson & Wiker 2005, Parker & Myrick 2009). There are no universally accepted classification of simulation however it may be described as low, medium and high fidelity referring to their degree of realism or authenticity (Seropian *et al.* 2004).

Clinical simulation is aligned with experiential learning theory (Kolb 1984). It is an active learning strategy which is learner centered where the educator acts as a facilitator of learning (Jeffries 2005). Clinical simulation offers the opportunity to be exposed to time critical clinical scenarios which may highlight the vagaries of clinical practice and the acutely unwell deteriorating patient. Indeed, research had highlighted some benefits in adopting clinical simulation training to replicate such clinical scenarios. Wayne et al. (2005) demonstrated that health care professionals showed improved proficiency of advanced life support (ALS) skills after simulation rather than clinical experience alone. Moretti et al. (2007) reported improved patient outcomes following cardiac arrest when hospital resuscitation teams had received ALS training via simulation.

Buckley and Gordon (2011) conducted a follow-up survey evaluating graduate nurses' ability to respond to clinical emergencies in clinical practice following high fidelity simulation training. The participants reported that following simulation training they felt the ability to respond in a systematic way, communication with the emergency team and airway management were the most improved skills. More recently, Kelly *et al.* (2014) conducted a descriptive pre and post- test survey which asked students to self-rate their skill ability and confidence in relation to recognising and responding to a deteriorating patient. The findings demonstrated that after undertaking simulation training there was an improvement in the self-rated ability to assess and recognise a deteriorating patient and willingness to seek expert help. Whilst the above studies show encouraging results both were self-report studies which lack objective criteria measuring actual clinical performance.

Undoubtedly, simulation allows opportunity to rehearse technical and clinical decision making skills in a safe environment without posing risk to patient safety (Endacott *et al.* 2010; Stayt 2012). Simulation has also been heralded as improving learners self-confidence (McCaughey & Traynor 2010; Buckley & Gordon 2011), self-efficacy (Bantz *et al.* 2007; Buykx *et al.* 2011) and problem solving and clinical decision making (Baillie & Curzio 2009; Wagner *et al.* 2009). However, simulation is often resource intensive involving high staff to student ratios and utilises expensive equipment (Stayt 2012). Furthermore it is unclear if skills taught by simulation are effectively transferred into effective clinical performance in clinical practice (Merriman *et al.* 2014; Buckley & Gordon 2011). The

purpose of this research study is therefore to evaluate the effectiveness of clinical simulation compared with traditional classroom teaching in the development of the skills required to recognise and manage the deteriorating patient.

Following a preliminary pilot study (Merriman *et al.* 2014) which tentatively suggested that clinical simulation was a more effective educational strategy than classroom teaching for the development of the skills required to recognize and assess the deteriorating patient, the second phase of this research further investigates this hypothesis in larger student cohorts across two higher education institutes.

THE STUDY

Aims

The aim of this study was to evaluate if clinical simulation is more effective than traditional classroom teaching in developing the skills required to effectively recognise and respond to the deteriorating patient. The objectives of this study were as follows:

- To compare the use of a systemic approach (Airway Breathing Circulation Disability Exposure) to recognize the deteriorating patient either taught via clinical simulation or classroom approach.
- To assess the relationship between self-reported self-efficacy and competence compared with actual performance
- To evaluate student satisfaction with the teaching method to which they were randomized.

Design

This study was a two centre phase II single, randomised, controlled trial (RCT) with single blinded assessments. Figure 1 is the Consolidate Standards of Reporting Trials (CONSORT) flow diagram of this study (Moher *et al.* 2010)

Participants

A convenience sample of 170 Undergraduate Adult Nursing students who commenced their studies in September 2012 were invited to participate from two Higher Education Institute Universities situated in the south of England and in the East Midlands.

The inclusion criteria were all students who were in their second semester of their first year of a BSc Adult Nursing Degree programme. Exclusion criteria were those students who had commenced their studies either before or after September 2012. Students who had joined this student cohort from other higher education institutions were also excluded from the study as they may not have had the same learning experiences.

Sample

First year adult nursing students from both research sites were invited to participate by letter which included an invitation and participant information sheet. The participant information sheet discussed the nature, purpose and methods of the study. The researchers also visited the invited students at the end of a lecture in order to give them the opportunity to ask any questions. Students were asked to express interest in participating via email to the principal investigator.

From the results of the pilot study (Merriman *et al.* 2014), with a control group mean of 16, SD of 3.7 and intervention group mean 19 SD 3.2 with a power of 0.8 and alpha of 0.05, fifty-one participants would be needed in each group (n=102 in total) in order to demonstrate significant difference in the outcome measures between the control and intervention group. We aimed to recruit 120 participants to allow for people dropping out and non-attendees. In the final study 58% (n=98) of all invited students volunteered to participate. The University in the South of England recruited 56 students and the University in the East Midlands recruited 42 students. It is acknowledged that this is four participants less than ideal.

Randomization

Participants were randomly allocated using a computer software programme to either a control group (classroom based teaching) or intervention group (clinical simulation). Participants recruited to the study were allocated the next available study number by the principle investigator. The study number related to a computer-generated randomisation list drawn up in Microsoft Excel by an independent researcher (blocks sequence generation, blocks of 6) to randomise participants into either the control group (classroom based teaching) or intervention groups (clinical simulation) using a 1:1 ratio. The list was held by the principle investigator but the allocation was concealed from the researchers and assessors who were in contact with the participants until the end of the study. There were 50 participants in the control group and 48 participants in the intervention group.

Blinding

The research team responsible for collecting pre and post intervention data were blind to the participants' allocation. Researchers who delivered the control and experimental interventions, where blinding was not possible, had no involvement with data collection.

Interventions

The students allocated to the control group received a one hour lecture in a standard classroom on the assessment and management of the acutely unwell patient following the principles of the systematic ABCDE process. This reflects the normal teaching intervention that students at this stage of their learning would receive. There were approximately twenty-five students in each lecture.

The intervention group received clinical simulation teaching in a clinical skills laboratory which lasted two hours and had a ratio of one facilitator to five or six students. Participants in the intervention group had the opportunity to observe the facilitator following a systematic ABCDE assessment and management process on medium fidelity patient simulator (ALS Simulator, Laerdal Medical) using a clinical scenario of an acutely unwell patient who is exhibiting signs of clinical deterioration. Student participants then had multiple opportunities to individually practice following the ABCDE process on the patient simulator whilst receiving individual verbal feedback on their performance.

Data Collection

Data were collected during July 2013 by a team of researchers who are senior Registered Nurses working in acute care settings with Immediate Life Support training (Resuscitation Council UK 2010) within local hospitals. The data collection team all received comprehensive training on the use of the data collection tools. The same researchers delivered identical educational interventions and collected data in exactly the same way at both University sites to ensure reliability.

Outcomes

Prior to the teaching intervention, participants from both the control and intervention group underwent a pre-test Objective Structured Clinical Examination (OSCE). After the respective teaching interventions, a post-test OSCE was undertaken. The OSCE comprised of a check list of 24 objective performance criteria that evaluated participants' performance of assessing and managing a deteriorating patient using a patient simulator. The performance criteria and an example of the clinical scenarios are described in Figure 2. Identical OSCEs were used in both University sites.

Participants were also asked to complete a General Perceived Self Efficacy Scale (Schwarzer & Born 1997) and Self-Reported Competency Scores (Bartlett *et al.* 1998) (GPSEC). Following the teaching intervention participants were asked to complete a student evaluation of teaching form in order to evaluate student satisfaction with their allocated teaching. The OSCE checklist, GPSEC and student evaluation of teaching questionnaires were utilised in the pilot study (Merriman *et al.* 2014) and were found to be adequate; therefore no changes were made for this study.

Ethical Considerations

Ethical approval was received from both institutional ethics committees and permission was also gained from the appropriate Heads of Department. Written informed consent was gained from each participant prior to their participation. It was emphasized to the participants that their participation in the study would in no way influence their further studies at the University and they were made aware of their right to withdraw from the study at any time without any consequences. The Research was performed and reported in accordance with the Consort guidelines (Moher *et al.* 2010).

Data Analysis

Data were analysed utilising IBM Statistical Package for the Social Sciences Version 19 (SPSS). Data were analysed using non-parametric statistics as the interval and ratio proprieties of the OSCE checklist and GPSEC scale had not been measured. A Man-Whitney U-test was used to assess the equivalence of groups at baseline and change from pre-test data for General Perceived Self Efficacy and Self-Reported Competency Scores (GPSEC), OSCE and the evaluation of teaching. Spearman's rank correlation co-efficient was used to assess the association between self-reported competence, self-efficacy data with pre and post intervention OSCE performance data. Alpha was set at 0.05

Validity and reliability/ rigour

This study occurred across two different university sites contributing to the generalizability of the findings. Reliability between the two sites was ensured by utilising the same members of the research team to deliver identical educational interventions at both sites. In addition, the same researchers collected the data at both sites. Researchers collecting the data were blind to the participants group allocation. The General Perceived Self Efficacy Scale developed by Schwarzer and Born (1997) and the Nursing Competencies Questionnaire developed by Bartlett, Westcott and Hand (1998) are both validated tools and have been utilised multiple times in other research studies (Launder *et al.* 2008; Chang & Crowe 2011). The OSCE checklist was originally developed as an

educational assessment tool and has been used widely within the University setting. During its use as an examination tool, the OSCE checklist has been subject to continual review and appropriately modified by university educators and clinical peers. The OSCE checklist was found to have a reliability coefficient of 0.91 which was measured during the pilot study. The student evaluation of teaching form was based on the standard form utilised throughout the university. The CONSORT guidelines (Moher *et al.* 2010) have been closely adhered to in the preparation of this report.

RESULTS

Ninety- eight first year nursing students studying for a BSc in Adult Nursing, aged 18-50 years, mean 27.89 (SD 7.8) years took part in the study. Eighty-eight (89.7%) participants were female and 10 (10.2%) male. Forty-eight participants were randomised to the control group and fifty participants to the intervention group. The demographics for each group are detailed in table 1.

OSCE Performance

A summary of the results of the pre and post intervention OSCEs for participants can be found in table 2. Students could achieve a maximum OSCE score of 24. Table 2 displays all students pre and post intervention OSCE scores which resulted in a pre-intervention range of 4-12 and a post-intervention range of 7.5-23. The median mark was 6.8 (SD 2.3) pre-intervention and rose to 15.7 (SD 4.7) post-intervention. Both groups had very similar pre-intervention OSCE scores, control group range of 2.5-14.5, mean 7 (SD 2.5) and intervention group range of 3.5-14.5, and mean 6.72 (SD 2.2). These findings show no significant difference (p=0.39 Mann-Whitney U-test). However there is a significant difference between the two group's post-intervention scores, with the control group range being 7.0-21.5, mean of 13.2 (SD 4.8) and the intervention group range being 11.5-24.0, and mean of 18 (SD 3.2). These results indicate that the intervention group performed significantly better in their post-intervention OSCE compared to the control group.

General Perceived Self Efficacy and Self-Reported Competency Scores (GPSEC)

The GPSEC scores were measured out of 174 with the higher score indicating greater level of self-efficacy and self-reported confidence. The control group's pre intervention score ranged from 93-167, with a mean of 127 (SD 16) and their post intervention scores ranged from 94-166, with a mean of 137 (SD 15). The intervention group's pre-intervention GPSEC score ranged from 105-164, with a mean of 137 (SD 15) and their post intervention ranged from 112-170, with a mean of 141 (SD 15). There is a significant difference in pre and post intervention GPSEC scores for both groups (p=0.001

in both the control and intervention group) which indicates that both groups demonstrated a significant increase in their self-efficacy and self-reported confidence after their teaching intervention. However there was no significant difference between the control and intervention group (p=0.19 Mann-Whitney U-test). In other words the intervention group did not significantly increase their GPSEC scores compared to the control group.

Relationship of OSCE Score to GPSEC Score

GPSEC scores were analyzed to ascertain if there was a correlation between GPSEC scores and OSCE scores. Neither the pre-intervention or post-intervention GPSEC scores appear to be correlated with the participants OSCE performance in either the control or intervention group. The Spearman r coefficient for the control group pre-intervention OSCE score and GPSEC score is 0.016 (p=0.39). The Spearman r coefficient for the control group post-intervention OSCE score and GPSEC is 0.101 (p=0.027). Despite the post-intervention result demonstrating statistical significance the correlation is unreliable. The intervention group pre-intervention OSCE/ GPSEC score Spearman r coefficient is 0.009 (p= 0.5) and the post-intervention Spearman r coefficient is 0.000 (p=0.9).

Student Evaluation of Teaching

Table 2 provides a summary of the student's evaluation of their experience of their allocated teaching method. Students in the intervention group were significantly more satisfied with the teaching experience compared to those in the control group.

DISCUSSION

The results indicate that students who received simulation training performed a systematic ABCDE assessment and managed the deteriorating patient more effectively than those who received a didactic teaching approach. This suggests that simulation based education (SBE) may be more effective in meeting the learning outcomes of critical care nursing curricula. These results are reflected in other research by Alinier *et al.* (2006), Bruce *et al.* (2009), Cant and Cooper (2010) who similarly identified an improvement in OSCE performance with simulation training.

Reports of the mismanagement of the acutely unwell deteriorating patient and the resulting global concerns over patient safety have raised the profile of SBE programmes in both pre-registration and post-registration education (Issentberg *et al.* 2011). During the last decade the increased use of SBE within nursing curricula is evident- in the USA, up to 25% of clinical learning takes place in a

simulated environment (Lambton 2008), whilst in the UK 6% of the theory and practice hours can be substituted with simulated learning (Nursing Midwifery Council 2007).

However, SBE is costly and time consuming (Stayt 2012; Prion 2008; Levett-Jones *et al.* 2011) and therefore it is important to justify this level of expenditure by relating it to patient safety and outcomes. Whilst this study suggests that SBE may improve OSCE performance in recognising and responding to a deteriorating patient it neither indicates if these skills are transferred into the clinical setting nor if it has an impact on patient safety and outcomes. Schmidt *et al.* (2013) and Khan *et al.* (2011) suggest that SBE is associated with improved patient outcomes however, the evidence is presented from a medical training perspective where emphasis is placed on technical motor skill acquisition. Recognising and responding to a deteriorating patient requires additional, complex non-technical skills such as empathy, compassion, teamwork, situation awareness and clinical decision making all of which are inherent to patient safety measures (Department of Health [DOH] 2012; World Health Organisation [WHO] 2009). Nursing SBE therefore needs to not only consider traditional technical skill acquisition, as seen in simple skills with low processing content, but also the non-technical, human factor skills.

Healthcare providers' and Higher Educational Institutes' responsibility to ensure nursing staff are deemed competent to recognize and respond to a deteriorating patient (DoH 2009) alongside the recommendations of 'Framework for Technology Enhanced Learning' (DoH 2011) provides an impetus to incorporate simulation based training into nurse education. This study adds to the growing body of literature that continually suggests simulation is a useful addition to the blend of educational strategies. However, there is an undeniable need for more evidence that demonstrates that performance in a simulation translates into clinical practice. Studies such as Wayne *et al.* (2006) and Barsuk *et al.* (2010) suggest that SBE may lead to positive changes in behaviour in the clinical environment in medical personnel however, there are few studies examining nursing practice and fewer still that examine the impact on the quality of patient care and patient safety (Aebersold, 2013).

This study found that whilst there was a generalised improvement in self-efficacy and self-reported competence after teaching regardless of method, it appeared to have no significant correlation with OSCE performance. Existing research that investigates self-efficacy and clinical performance in relation to simulation education has produced variable outcomes. Roh *et al.* (2013) and Liaw *et al.* (2012) concur with the findings of this study and found no significant relationship between self-

efficacy and performance. Conversely other studies suggest that self-efficacy is associated with improved skill performance (Orgun & Karaouz 2013; Peterson-Grazious *et al.* 2013; Buykx *et al.* 2011). The variability in findings may be related to the difficulty of objectively assessing skill performance and self-efficacy. Baxter and Norman (2011) suggest that any methods of self-assessment are not reliable indicators of an individual's ability to self-assess their performance in a clinical setting. There is also great variability in study design with regards to the tools used to measure clinical performance. Many studies use an OSCE tool which may vary in complexity. Many OSCE tools focus on the achievement of technical tasks and do not necessarily assess human factor skills which whilst more difficult to quantify are equally critical to effective clinical performance.

Investigation of the role of simulation in developing self-efficacy is an important avenue of research as self-efficacy has emerged as a highly effective predictor of students' motivation and learning (Zimmerman 2000). Furthermore self-efficacy may influence choice of activities, level of effort, persistence and emotional reactions (Orgun & Karaoz 2013). Bandura (1993) suggests that students with high self-efficacy participate more readily, work harder, persist longer and have fewer adverse emotional reactions when they encounter difficulties. The demands of healthcare and the patient safety agenda demands that the graduate nurse needs to be work ready, be self-motivated, able to face challenges and show persistence and motivation in the clinical area. It is therefore important to establish the role of simulation in developing self-efficacy not only to ensure students achieve academic learning outcomes but also to transfer their self-efficacious attributes into the clinical environment where patient outcome and safety is paramount.

Students reported greater satisfaction with the simulation teaching strategy than traditional didactic approach. This has been reflected in other research where students report being highly satisfied with simulation based education (Wagner *et al.* 2009). Student satisfaction may contribute to a student's intrinsic motivation to learn and the attainment of learning outcomes. Walker *et al.* (2006) suggest that intrinsic motivation may lead to meaningful cognitive engagement with learning rather than superficial learning. Student satisfaction and motivation are important considerations as potentially they may influence the successful achievement of the professional requirements detailed in Competencies for Recognising and Responding to Acutely Ill patients in Hospital (DoH 2009) and the Technology Enhanced Learning Framework (DoH 2011).

Limitations

There are a number of limitations of this study which may restrict the interpretation and generalizability of the reported results. The study sample size was slightly below the power calculation. It is not known why other invited students declined to participate in the study. Convenience sampling was utilised and therefore students with a particular interest in simulation education or caring for the acutely unwell patient may have been more inclined to volunteer to participate.

Generalizability is limited to undergraduate students with similar characteristics to those included in the study. Participating students were all at the end of their first year of nursing studies therefore may be considered to be novices in clinical practice. The results may have been very different had the study sampled students in their final year of study or even newly graduated nurses. Furthermore the participating students may have a variety of backgrounds and experiences in health care. Many nursing students prior to the commencement of their studies have previously worked in un-registered roles within healthcare whilst others will have no previous experience. This variation may have affected the baseline measurement of clinical performance and GPSEC.

There was a short time (approximately 24 hours) in between the pre-test and post-test which may have deceptively inflated the OSCE performance scores. Whilst we can indicate a trend in skill and knowledge gain we are unable to substantively comment on their retention. A longitudinal study would be required to ascertain this information.

CONCLUSION

Patient safety is high on the global health care agenda. In particular the effective recognition and management of the deteriorating patient is often prioritised due to the potential impact on patient outcomes and resources. Healthcare providers and educational institutes have a responsibility to ensure that staff are competent in the early recognition and effective management of acutely ill and deteriorating patient. This study contributes to the growing body of evidence that indicates that simulation based education may be an effective strategy in developing the skills and knowledge required to achieve this clinical competence.

Whilst this study suggests that SBE may be a worthwhile investment it only contributes to educational research at translational science level 1 (T1) where the design and delivery of training protocols and the measurement of education progress to study outcomes only occurs in a controlled laboratory (McGaghie 2010). In order to further justify SBE, robust research evidence that contributes to translational science level 2 (where skills are transferred into clinical practice) and 3

(the influence on patient care and outcomes) (McGaghie 2010) is required. Consequently, a longitudinal study examining nurses' application of knowledge and skills acquired through SBE to the clinical environment and the subsequent retention of these skills would be a worthwhile avenue of further research. Only then could the influence of SBE on patient safety and outcomes be measured.

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Figure 1. CONSORT Participant Flow Diagram

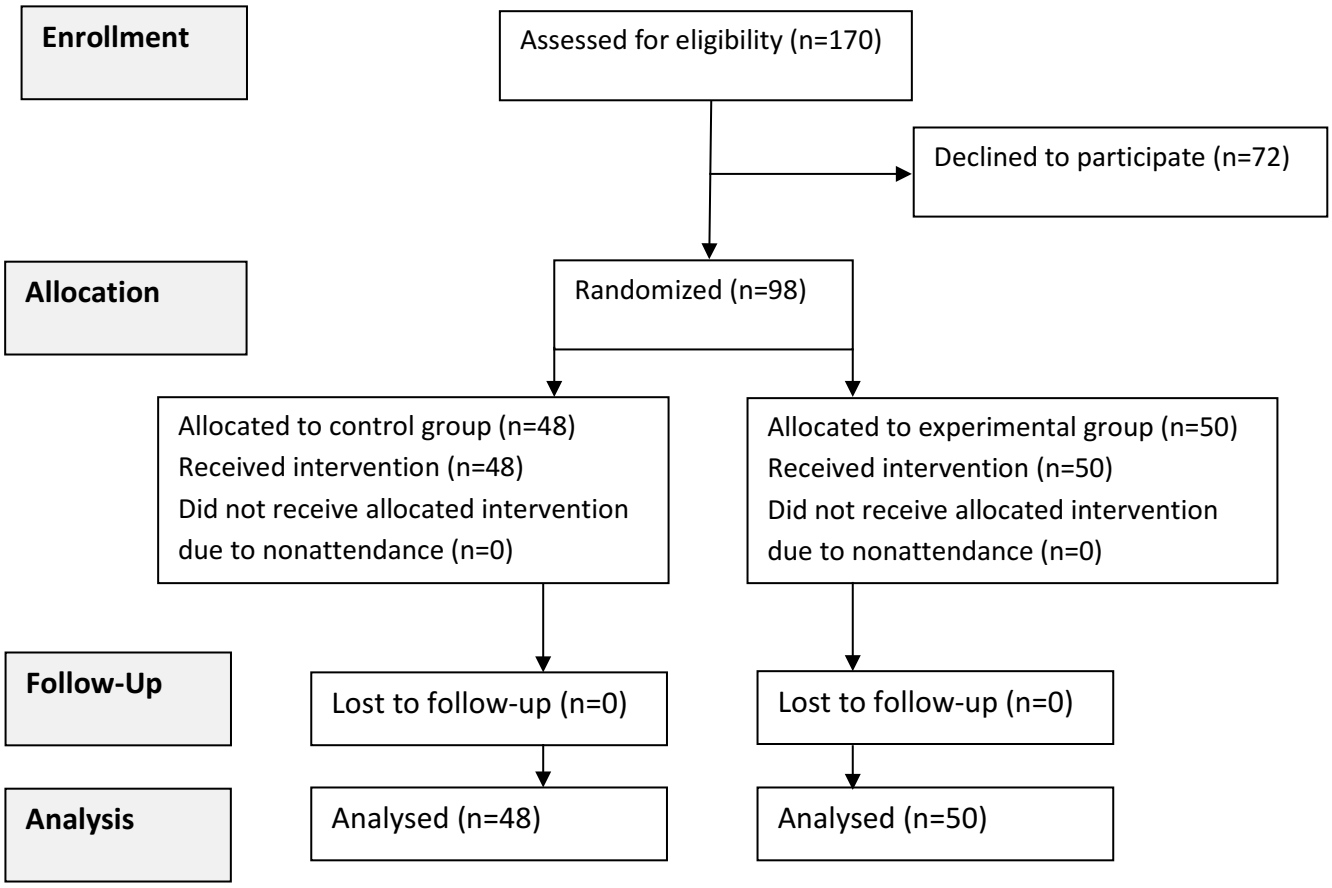

Figure 2: Example of Clinical Scenario and ABCDE Assessment Criteria

Clinical Scenario	You are working on a medical assessment ward. Mr Gerald Smith is a 45 year old gentleman has just been admitted via his General Practitioner (GP) with shortness of breath. The nurse in charge has asked you to undertake the initial assessment of this patient.
A-Airway	Check airway to ascertain if clear. A clear verbal response indicates a patent airway. Listen for sounds that may indicate a partially obstructed airway, such as snoring, gargling, coughing, wheeze or stridor. If any partially or fully obstructed treat or call for expert help.
B-Breathing	Assess depth, rate and rhythm of breathing. Observe effort of breathing and use of accessory muscles and symmetrical chest expansion. Monitor oxygen saturations. If patient is showing signs of respiratory distress and/or saturation compromised apply high flow oxygen and consider calling for expert help.
C-Circulation	Feel skin temperature and observe skin colour. Assess pulse for rate, rhythm and strength. Monitor Blood pressure and capillary refill. Monitor output from urinary catheter and/or any wounds or wound drains. Assess the need for intravenous access and/or IV fluids. If required call for expert help.
D-Disability	Monitor brain function by assessing conscious level using the Alert, Voice, Pain, Unresponsive (AVPU) scale. Assess pupils for shape, size and reaction to light. Assess blood glucose. If required call for expert help and treat any abnormalities.
E-Exposure	Maintaining patients privacy and dignity expose the patient and observe for any signs that might indicate the cause of deterioration e.g. rashes, wounds, oedema, signs of sepsis. Record temperature. Check any notes, drug charts, events leading up to deterioration for possible causes. Call for expert help if required and treat any abnormalities. Continue to assess using ABCDE until improvements and/or expert help arrives.

Adapted from Smith et al (2002), NICE (2007) and Resuscitation Council (2010)

Table 1: Participant Demographics

	Control Group n=48 Mean (SD)	Intervention Group n= 50 Mean (SD)	Total N=98 Mean (SD)
Age (years)	29.5 (8.4)	26.3 (7.0)	27.89 (7.8)
Gender (male:female)	6 (12%): 43(88%)	4 (8%): 45 (92%)	10 (10.2%): 88 (89.2%)

Table 2: Pre and Post intervention OSCE/GPSEC and Evaluation Results

	Pre Intervention			Post Intervention		
	Control Group Mean (SD)	Intervention Group Mean (SD)	p-Value	Control Group Mean (SD)	Intervention Group Mean (SD)	P-Value
OSCE (out of 24)	7.0 (2.5)	6.72 (2.2)	p= 0.391*	13.2 (4.8)	18 (3.2)	p=0.02
GPSEC (out of 174)	127 (16)	130 (13)	P=0.364	137 (15)	141 (15)	p<0.192
Student Evaluation (out of 85)				78.1 (6.8)	82.6 (4.5)	p<0.001

Significance defined as p< 0.05 Mann-Whitney U-test

OSCE maximum score = 24, GPSEC maximum score = 174, Student Evaluation Maximum Score = 85