Interprofessional education in advanced life support training for medical and nursing students

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Abstract

Purpose: *Interprofessional education (IPE) has emerged as a critical component in healthcare education, especially in the context of advanced life support (ALS) training. IPE has been demonstrated to improve student's learning experiences and perceived levels of confidence in ALS management. We aimed to investigate how IPE affects undergraduate medical and nursing students' perceptions of their non-technical skills in ALS simulations.*

Methodology: *Medical (44, Joint Medical Program, Universities of Newcastle, and New England) and nursing students (26, Central Coast Nursing Program) attended across the four course days at Central Coast Clinical School, Gosford Hospital. Pre-and post-workshop questionnaires were completed. The course consisted of four skills stations focusing on communication within different aspects of ALS management, and three simulation stations.*

Findings: *Of the participants, 49% reported insufficient coverage of non-technical skills in previous course content. There was increased comfort using graded assertiveness from before (81%) to after (96%) the course. Almost all participants (97%) reported a 'reasonable' or 'good' level of understanding of communication styles and tools post-course. A vast majority of participants recommended this course structure for future students and 91% reported increased communication, leadership and teamwork skills post-course.*

Research implications: *This study contributes to a building body of evidence that IPE improves students' non-technical skills and preparedness for professional work.*

Practical implications: *This study indicates that IPE should be included into current Australian university curricula. This model of education can be implemented easily across multiple settings.*

Originality/value: *This study was based on preliminary work at Gosford Hospital but had an original study design.*

Limitations: *Two key limitations were that there was no control group to compare to and there was an over-representation of medical students compared to the number of nursing students.*

Keywords: interprofessional education, medical education, critical care, cardiac arrest, advanced life support.

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INTRODUCTION

Healthcare settings are challenging environments requiring teamwork and communication between various professionals to improve patient outcomes (Patel & Hullick 2024). Interprofessional education (IPE) has emerged as a critical component in healthcare, especially in the context of advanced life support (ALS) training. IPE involves students from different healthcare professions learning together with the purposing of fostering collaboration and teamwork, and has emerged as a pivotal educational strategy (World Health Organization 2010). Simulation-based education facilitates immersive training, and does so using various tools, such as manikins and simulated patients (Patel & Hullick 2024).

The application of IPE into ALS training addresses the traditional separation of nursing and medical students. IPE has been shown to improve students' learning experiences and encourage a more collaborative approach. This better prepares students for professional clinical environments (Reeves et al. 2013).

Previous studies have highlighted the importance and effectiveness of interprofessional ALS (IP-ALS) training. Scherer and colleagues (2013) found that both medical and nursing students who participated in IPE demonstrated an improved sense of confidence and higher scores in knowledge when compared to those in intra-professional education (Scherer et al. 2013). Lau and colleagues (2022) explored the influence of IP-ALS training on nursing students using a sequential mixed-methods approach. IP-ALS increased students' perceived levels of confidence, interprofessional collaboration, self-efficacy and emotional regulation (Lau et al. 2022).

The positive reaction and demonstrated effectiveness of IPE-ALS suggests that the integration of IPE into ALS curricula is crucial to prepare healthcare students for professional clinical environments. However, there is a current under-use of IPE within nursing and medical undergraduate programs across Australia (Brewer et al. 2024).

We aim to investigate the effect of IPE on undergraduate medical and nursing students' perceptions of their non-technical skills in cardiac arrest simulations. We hypothesise that the use of IPE will improve perceived competence and non-technical skills in cardiac arrest management.

METHODS

This study was approved by the Central Coast Local Health District Research Committee (Ref. 0424-042C).

RECRUITMENT

Our study cohort was recruited for IPE-ALS training using targeted invitations in the form of posters and email communications. The study population included final-year undergraduate medical students enrolled in the Joint Medical Program at the University of Newcastle and the University of New England, as well as undergraduate nursing students from the Central Coast Nursing Program. The workshop was conducted at the Central Coast Clinical School campus at Gosford Hospital.

In total, there were four course days, which were each five hours in total duration.

WORKSHOPS

Participation in the pre-and post-workshop questionnaires (see Supplements 1 and 2) was entirely voluntary. This participation required agreement to written informed consent. The workshops were structured with a combination of didactic and practical components. First, participants were given a brief lecture, focusing on various communication tools and revision of the ALS algorithm, to provide foundational knowledge.

Subsequently, participants rotated through four practical workshops:

1. **Airway Management**: Participants were trained in basic airway manoeuvres, including head-tilt, chin-lift, and jaw-thrust techniques. Instruction also covered the correct insertion and usage of oropharyngeal airways.

2. **Cardiac Arrest Confirmation**: This station emphasised recognition of cardiac arrest, initiation of effective chest compressions and clear communication when initiating or requiring role swaps during compressions.

3. **Simulated Defibrillation**: Participants were introduced to the safe defibrillation algorithm and practiced its application during simulated scenarios. They identified arrhythmias, and determined shockable and non-shockable rhythms.

4. **Reversible Causes of Cardiac Arrest**: Participants were taught how to systematically evaluate and manage reversible causes of cardiac arrest. Participants practiced integrating these skills during a simulated cardiac arrest scenario.

Each workshop provided hands-on opportunities to develop technical skills. In addition, students were required to practice their communication and teamwork skills during these workshops.

SIMULATIONS

After the workshops, participants were divided into three interprofessional groups, each composed of both medical and nursing students. These groups participated in three high-fidelity ALS simulation scenarios designed to mirror realistic critical care clinical situations.

Each simulation focused on integrating the taught technical and non-technical skills. The scenarios were conducted using mannequin patients, and standardised equipment, such as ALS equipment trolleys and defibrillators. Trained facilitators, including senior clinicians and educators, acted as observers and assessors during the simulations. Assessment was conducted using the Team Emergency Assessment Measure (TEAM) scoring sheet (Cooper et al. 2010), a validated instrument designed to evaluate teamwork performance in emergency resuscitation settings. Feedback and clinical de-briefing were provided in a structured format immediately following each simulation.

RESULTS

The study cohort consisted of 70 participants – 44 medical and 26 nursing students. Half (50%) of the students had no prior experience in interprofessional or multidisciplinary critical care situations or simulations. Students self-assessed their knowledge in various areas, before and after attending the course (Table 1). Initially, 6% (4) and 61% (43) rated their understanding of multidisciplinary teamwork in cardiac arrests as 'poor' or 'some' understanding, respectively. Post-course, no students rated their understanding as 'poor', while 93% (65) rated it as 'good' (Table 1).

Table 1: Comparison of participant self-assessments pre- and post-course.

		Pre-course	Post-course
Following the course, do you feel like you have a good understanding of different communication styles or models you can use in critical care situations?	Not really	N/A	0 (0%)
	A little		2 (3%)
	A reasonable understanding		31 (44%)
	A good understanding		37 (53%)
Self-assessment of understanding of multidisciplinary teamwork in cardiac arrest management	Poor	4 (6%)	0 (0%)
	Some understanding	43 (61%)	5 (7%)
	A good understanding	23 (33%)	65 (93%)
Self-assessment of understanding of the role of other professions in acute life support scenarios	Poor	8 (11%)	1 (1%)
	Some understanding	49 (70%)	11 (16%)
	A good understanding	13 (19%)	58 (83%)

		Pre-course	Post-course
Comfort speaking up during critical care situations	Not at all	9 (13%)	0
	A little uncomfortable	14 (20%)	0
	I'll speak up if I really need to	19 (27%)	15 (21%)
	I'll speak up and ask questions	23 (33%)	25 (36%)
	I'm comfortable	5 (7%)	30 (43%)
Belief that compared to non-technical skills, medical and nursing knowledge is more important in cardiac arrest situations	Agree	10 (14%)	12 (17%)
	Disagree	60 (86%)	58 (83%)
Comfortable using graded assertiveness	Agree	57 (81%)	67 (96%)
	Disagree	13 (19%)	3 (4%)
Belief that compared to handovers, taking ownership is more important	Agree	8 (11%)	13 (19%)
	Disagree	62 (89%)	57 (81%)
Agree or disagree: Multidisciplinary teamwork improves patient outcomes	Agree	69 (99%)	70 (100%)
	Disagree	1 (1%)	0
Total participants		**70**	**70**

Understanding of other professions' roles in cardiac arrests improved similarly, with pre-course ratings of 11% (8) 'poor', 70% (49) 'some', and 19% (13) 'good'. After the course, only one participant rated their understanding as 'poor', with 16% (11) rating their understanding as 'some' and 83% (58) as 'good' (Table 1).

Comfort in using graded assertiveness during critical care scenarios increased from 81% (57) pre-course to 96% (67) post-course. Prior to the course, 13% (9) were not comfortable speaking up at all, but this dropped to 0% post-course. Similarly, the proportion who felt a little uncomfortable speaking up decreased from 20% (11) to 0% post-course. The number of participants willing to speak up only when necessary, declined from 27% (19) to 21% (15), while those comfortable asking questions increased from 33% (23) to 36% (25). The proportion of participants fully comfortable speaking up rose significantly from 7% (5) to 43% (30) (Table 1).

The importance of multidisciplinary teamwork was recognised in a similar fashion both before (99%) and after (100%) the course. After the course, no participants rated their understanding of communication styles used in critical care as 'poor,' with 44% (31) rating it as 'reasonable' and 53% (37) as 'good' (Table 1).

After the course, 91% (64 of 70) reported positive effects, importantly feeling the course improved the non-technical skills needed for when they graduate, such as teamwork and communication. The majority of participants strongly recommended using ALS teamwork simulations, with many suggesting a continuation of the training and an expansion to include more interprofessional training. One participant stated, 'Absolutely, if given the chance, I'll be coming back next year and the year after. This has been an incredibly informative experience.'

DISCUSSION

STRENGTHS

The training was effective in enhancing interprofessional collaboration and communication, and overall learning in ALS management. In addition, there was a positive response to this form of education and a large majority of our study cohort would recommend IPE to future students. It is promising to also see that the comfort in using graded assertiveness and the confidence to speak up increased following IPE.

Despite differences in study design, our results are consistent with previous work. The importance of IPE in building and sustaining effective teamwork and dynamics has been demonstrated previously (Hood, Cross & Cant 2022). IPE has also been shown to contribute to an increase in self-confidence in non-technical and technical skills (Lucktar-Flude et al. 2010). IPE in CPR training has been received well by medical and nursing students (Dagnone et al. 2008) and a 2017 systematic review also revealed a high degree of student satisfaction with IPE-based CPR training (Onan et al. 2017).

TEAM is a validated tool for assessing teamwork, communication and leadership in ALS management. An accurate assessment of the impact of IPE on TEAM scores was not feasible, as variations in station schedules on different days and differences in station difficulties introduced variability that could confound the results. Morse and colleagues (2019) found that the use of IPE in immediate life support scenarios increased TEAM scores. Furthermore, participants reported more collaborative team performance and a better learning experience than those who received uniprofessional learning (Morse et al. 2019).

Despite these benefits and strengths of IPE, there is limited uptake of IPE by Australian university medical and nursing programs. Homeyer and colleagues (2018) identified both barriers and enablers to the use of IPE. Key barriers included different levels of knowledge, lack of harmonisation of curricula between nursing and medical schools, and differences in resource and time utilisation. However, more enablers were found than barriers to the implementation of nursing and medical student IPE (Homeyer et al. 2018).

It is encouraging to see that our students recognised the critical importance of multidisciplinary teamwork in ALS situations, as

demonstrated by the pre-and post-questionnaire results. This aligns with the evolving nature of clinical medicine, where collaborative and multidisciplinary approaches are forming the foundation of patient care. This acknowledgment of teamwork underscores the value of continuing to develop IPE in medical and nursing training, as a means to prepare our future healthcare professionals for modern clinical practice. The responses from our cohort also indicate a strong preference for the continuation of ALS teamwork simulations. Many of our students suggested that this training be expanded further to include more interprofessional opportunities. This reflects growing recognition of IPE and its importance in building collaborative skills and preparedness for professional work.

An interesting finding from our study was that almost 50% of students reported insufficient coverage of non-technical skills, such as communication and leadership, in their previous course work. Previous research has indicated that non-technical skills are inadequately covered in undergraduate medical programs (Nicolaides et al. 2018; Pollard & Tombs 2022). Despite the critical role that these skills play in clinical care, it is clear that many medical students feel underprepared in this area, and this highlights the need for further training. Given the benefits of IPE, its potential role in addressing this shortfall is clear.

LIMITATIONS

One limitation of this study is the lack of a control group. This limits our ability to make inferences about any superiority that IPE has over traditional uniprofessional education methods. However, in studies where the two were compared, IPE was shown to increase student confidence and improve knowledge retention more than traditional intra-professional education (Scherer et al. 2013). Another limitation in our study is the under-representation of nursing students. While we had a good sample size, we had more medical than nursing students, which could have minimised the effect of the nursing students' responses to our questionnaires. The evaluation relied on self-reported data, potentially introducing bias and limiting objectivity. These limitations are areas for further studies to build upon. For example, future studies could increase sample size with equal representation of medical and nursing students. Studies could also implement a mix of self-reported data and the use of validated assessment tools to evaluate improvements in both non-technical and technical skills. In addition, the use of IPE could be examined in areas of clinical practice other than ALS. Another possible approach would be to compare the experiences of medical and nursing students to find differences in their perceptions, confidence and learning. This may reveal opportunities to tailor this form of learning more effectively. These potential avenues could further elucidate the benefits and strengths of IPE.

CONCLUSION

Our data suggests IPE increases perceptions of non-technical skills in ALS simulations. In addition, there was a strong positive response to this form of education by the study cohort, with a large majority recommending it to future students. This work adds to the growing body of literature recommending the widespread inclusion of IPE into Australian medical and nursing curricula.

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SUPPLEMENTARY MATERIAL

This supplementary material was part of the submitted manuscript and is presented as supplied by the authors.

Supplement 1 – Pre-workshop questionnaire

1. Have you participated in interprofessional or multidisciplinary critical care situations or simulations before?

2. How would you rate your understanding of the role of multidisciplinary or interprofessional teamwork during critical care situations?

3. How would you rate your understanding of the role of other professions in acute life support scenarios?

4. Do you feel comfortable speaking up during critical care situations?

5. Would you consider the practice of verbalising one's thoughts during critical care simulations as indicative of effective or ineffective leadership, particularly in scenarios involving cardiac arrests?

6. Do you perceive yourself as possessing an understanding of diverse communication styles or frameworks applicable within the context of critical care scenarios?

7. Has your training to date adequately taught non-technical skills (communication, leadership, feedback) needed for when you graduate?

8. For the following questions please state whether you agree or disagree:

    a. At an arrest, communication between team members is not as important as good medical/nursing knowledge.

    b. I feel confident voicing concerns if I think another clinician who is not from my profession has a misunderstanding about a patient

    c. Handovers are not very important for patient care as part of being a good doctor/nurse is finding out for yourself

    d. Multidisciplinary teamwork improves patient outcomes

Supplement 2 – Post-workshop questionnaire

1. How would you rate your understanding of the role of multidisciplinary or interprofessional teamwork during critical care situations?

2. How would you rate your understanding of the role of other professions in acute life support scenarios?

3. Do you feel like you have a good understanding of different communication styles or models you can use in critical care situations?

4. Do you feel comfortable speaking up during critical care situations?

5. Would you consider the practice of verbalising one's thoughts during critical care simulations as indicative of effective or ineffective leadership, particularly in scenarios involving cardiac arrests?

6. Has today helped build the non-technical skills (communication, leadership, feedback) needed for when you graduate? Please provide further comments if possible.

7. Would you recommend using advanced life support teamwork simulation to students in the future? Please provide further comments if possible.

8. For the following questions please state whether you agree or disagree:

    a. At an arrest, communication between team members is not as important as good medical/nursing knowledge.

    b. I feel confident voicing concerns if I think another clinician who is not from my profession has a misunderstanding about a patient

    c. Handovers are not very important for patient care as part of being a good doctor/nurse is finding out for yourself

    d. Multidisciplinary teamwork improves patient outcomes