Experiences of learning, development and preparedness for clinical practice among undergraduate paramedicine students, graduate/intern paramedics and their preceptors: a qualitative systematic review

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Abstract

Introduction:

The educational landscape for paramedicine has evolved considerably since the introduction of the first paramedicine bachelor degree. This systematic review aims to identify and explore the barriers to and facilitators of learning and preparedness for clinical practice among undergraduate paramedicine students, graduate/intern paramedics and their preceptors. This review was undertaken in accordance with the JBI Reviewer's Manual. The full methods will be published in the final review report.

Results:

Twenty six qualitative studies were included in the review. A total of 305 findings were extracted and grouped into twenty eight categories. Categories were grouped into five synthesized findings as follows;

- The role of mentoring/ preceptorship
- Opportunities to develop emotional intelligence and communication skills
- The role of non-traditional placements
- The role of non-traditional teaching methods
- Preparedness for practice

Conclusion:

The review highlighted that a variety of models exist with associated barriers and facilitators that impact on paramedicine students, graduate paramedics, paramedic university educators and preceptors. The findings emphasize the importance of the preceptor to student learning; and the need to develop paramedicine student's skills/capacity in dealing with the emotional side of paramedic practice. Paramedicine students and paramedic graduates were found to be underprepared to effectively communicate with patients, family and other professionals. It is interesting to note that there is potential for most of these barriers to be mitigated by the utilization of non-traditional placements/experiences within the community, medical clinics, wilderness environment and in the allied health environment and with the use of non-traditional teaching methods like action learning, case based learning and project based learning. The introduction of a paramedic facilitator model was shown to have considerable benefits with the potential to resolve some of the barriers identified in other studies, suggesting that the introduction of a national model similar to that of other allied health models may be beneficial. The findings indicate a need for more effective communication between the education sector and industry in relation to the challenges that currently exist in paramedicine education and what models appear to facilitate learning, development and preparedness for clinical practice.

Introduction

Paramedics work in challenging situations often in uncontrolled and unpredictable environments with limited resources. The nature of the role and the contexts which paramedics often find themselves in requires the ability to work well under pressure in time-critical situations while communicating with patients and family members. Paramedics require a high level of self-direction and capacity to problem solve and are required to cope with high levels of responsibility.^{1,2} Clinical decision-making in these environments requires high levels of automaticity, good reasoning skills, and an ability to make critical decisions under pressure and in short time frames.^{3,4} The increased complexity of paramedic decisions and multi-level system influences may also exacerbate risks.⁴

Paramedics also face an ever-increasing burden of physical and mental stress from repeated exposure to critical incidents and human suffering that occur daily in our society. This exposure can create personal mental health challenges due to what they observe and experience, and the responsibilities they assume when trying to help.^{5,6} The need for robust education programmes to prepare paramedics for the challenges they will face is great, programmes that are relevant, realistic, purposeful and that create resilience so as to meet the ongoing demands faced in the real world setting of paramedicine.^{7,8}

These challenges within the paramedic context/environment are important considerations when looking at barriers/facilitators related to paramedic learning, especially in regard to educational preparation for the workplace. It is important to note that the educational landscape for paramedicine has evolved considerably since the introduction of the first paramedicine bachelor degree. In the mid-1990s, education for paramedics shifted from in-house training provided by ambulance services themselves to the university sector providing undergraduate tertiary qualifications in paramedicine.⁹⁻¹²

Due to considerable differences in educational requirements, training, scope of practice and job titles, the specific role and function of a paramedic can be difficult to define within an international context.¹² As such, the present review focused on paramedicine within the context of Australia, the UK and New Zealand as their systems are most easily comparable.^{13,14} In this review, a paramedic was defined as a qualified clinician on an emergency ambulance team, responding to medical and traumatic cases, providing assessment, treatment and transportation.¹⁵

In the UK, Australia and New Zealand, paramedics are required to complete a three-year undergraduate degree program.^{9-11,13} This incorporates a combination of lectures and tutorials teaching anatomy, physiology, ethics, medical law, mental health and communication skills. Practical sessions are included to

facilitate clinical skills as well as on-road clinical placement with ambulance services to gain workplace exposure and experience.^{9–11,13}

O'Meara highlights paramedicine education and training as having become an important issue as the profession in Australia and New Zealand has transitioned from vocational training to a pre-employment, university-based model.⁹ This shift came during a time of significant reform within the healthcare industry calling for a more highly skilled work force.^{16,17}

This systematic review identified the barriers to and facilitators of learning and preparedness for practice in students enrolled in paramedicine undergraduate degrees as well as graduate paramedics within Australia and New Zealand. Additionally, it included UK graduates who qualify as paramedics upon completion of their undergraduate degree working in their first year of practice.^{9,13,18} In order to also incorporate and investigate the experiences and views from another perspective, it included paramedic preceptors who work with and supervise undergraduate paramedicine students during clinical placements on ambulances. Also graduate paramedic preceptors who work with and supervise graduate paramedics during their graduate year, and university paramedic educators who facilitate tutorials and clinical practicum sessions at paramedicine undergraduate universities were also included.^{18–20}

The limited geographical contexts within paramedic learning have been chosen as they are most likely to provide valuable insight into the experiences of the journey of becoming a paramedic. This is based upon the hypothesis that the conversion to a university-based education program in these countries has given rise to new and emerging barriers to and facilitators of learning within the paramedic domain.²¹ The focus of this review was on experiences of these facilitators of and barriers to learning, development and their impact on preparedness for practice.

There is existing evidence of a number of barriers and facilitators that may impact on paramedic learning, development and preparedness for practice.⁹ Some of the barriers that have been identified in previous research in Australia and New Zealand include the lack of any mandatory requirements for the duration of clinical placements and the lack of quality standards for reporting students' performance during clinical placements, unlike most other health professions within Australia and New Zealand.^{9,13}

In contrast the UK has defined standards for paramedicine clinical placements, including a commitment from ambulance services that 50% of undergraduate pre-employment education includes clinical placements with ambulance services.⁹ This is a significant difference in job exposure equating to an average

of approx. 300 hours of placement in Australia and New Zealand, depending on the university, to approximately 2200 hours in the UK.^{9,13}

In Australia and New Zealand, new graduates enter “on-the- job” initial training that involves completing a paramedic internship/graduate program. This involves working on an ambulance for up to 12 months supervised by a preceptor without the capacity to practice independently. During this period, the graduates are supported and mentored, and job performance is constantly measured and documented.^{10,11,18} In the UK the graduate is considered almost job ready by ambulance services, only requiring a short induction program before commencing on road as a qualified paramedic able to practice unsupervised, which relates to spending 50% of their undergraduate degree on clinical placement.^{10,13}

The lack of job readiness of Australian and New Zealand graduates has caused some barriers within Australian and New Zealand universities and ambulance services, because of the need to provide internship/graduate programs due to graduates not being considered job ready.^{22,23} Some universities have increased the number of students enrolled with the expectation that ambulance services will provide extra placements for these students.²⁴ Ambulance services in Australia with one or two exceptions have not generally provided extra placements, some reducing the number of available placements, although they would prefer students to be more job ready.²⁴

Some Australian universities have tried to deal with the increasing lack of clinical placements available with Australian ambulance services by initiating other strategies like sending students on placement with overseas ambulance services or using DVD simulation to simulate the clinical placement environment.^{22,25} Reviewing participants’ experiences of these programmes will give us greater knowledge of whether these are suitable substitutes for Australian ambulance clinical placements.

The perspectives of paramedic preceptors regarding paramedic education has also been investigated.^{15,19,20,26,27} A facilitator to paramedic learning identified by preceptors from a multi-national study across Australia and New Zealand was review and reflection time, which is an important opportunity to provide feedback to and hear from the student, yet little time is allocated to this activity.⁹ This study has identified this lack of review and reflection time allocated as a barrier to paramedic undergraduate student learning while on clinical placement with ambulance services within Australia and New Zealand.⁹

A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews and the *JBIR Database of Systematic Reviews and Implementation Reports* was conducted and no current or underway

systematic reviews on the topic were identified.

The objective of this systematic review was to improve understanding within Australia, UK and New Zealand of challenges and/or facilitators to learning for undergraduate paramedicine students, graduate paramedics, newly qualified UK paramedics, their preceptors and paramedic university educators within the paramedicine learning paradigms.

It is clear that the educational landscape for paramedicine has evolved considerably since the mid-1990s. The move to university education for paramedicine in countries such as Australia, New Zealand and the UK has had a substantial impact on the types of graduates and their preparedness for clinical practice.^{11,28,29} As such, it is vital that learning opportunities are provided to support continuing education and that experiences of barriers and facilitators are identified so robust programs can be developed to ensure paramedics are adequately prepared for practice.⁹ These programmes need to meet the needs of the paramedic workforce by being relevant, up to date and well researched, providing the education to create understanding of the role and the resilience to prepare the graduate paramedic to support themselves and the community they strive to care for.^{7,30}

Results

Characteristics of included studies

The twenty six qualitative studies were published over a thirteen-year period from 2006 to 2019. Studies used semi-structured in person interviews;^{19,20,29,38-46} open ended interview questions,^{8,47-50} or focus groups,^{2,9,25,51-57} to collect data. Sample sizes ranged from 1 to 96 for studies using verbal interviews or focus groups.^{19,20,25,29,39-46,51-58} For studies that used a written narrative approach the sample size ranged from 8 to 54.^{8,47-50} The total sample size for participants in this review was 564.

Three countries were represented in the studies: Australia,^{19,38,40-42,44,46,48-54,58} Australia and New Zealand,^{25,59} the UK.^{8,29,39,43,56,57} and Australia and the UK.^{45,47,55} The participants and contexts included within the studies were as follows; Five studies provided the perspectives of university undergraduate paramedicine students while they were undergoing clinical placements on ambulances.^{8,25,29,42,58} Six studies were clinical placements undertaken by undergraduate paramedicine students in the allied health environment.^{41,44,46,49,52,53} Four studies provided the perspectives of paramedic preceptors of university undergraduate paramedicine students during clinical placements on ambulances.^{45,47,57,59} Two studies focussed on the perspectives of university paramedic educators delivering training to undergraduate paramedicine students in the university setting.^{38,40} Three studies gave the perspective of paramedicine

undergraduate students in relation to non-traditional teaching methods in the paramedicine university setting.^{39,50,56} Two studies gave the perspectives of graduate paramedic preceptors while providing mentorship to graduate paramedics during their graduate year.^{19,55} One study provided the perspectives of university undergraduate paramedicine students and their paramedic preceptors during clinical placements on ambulances with a clinical facilitator model, giving the experiences of both preceptors and students together in the same location and time frame.⁵¹ One study gave the views of undergraduate paramedicine students and their preceptors on professionalism in paramedicine.⁴³ One study gave the experiences of paramedicine undergraduate students undergoing a wilderness experience.⁵⁴ One study showed the experiences of undergraduate paramedicine students undergoing a community volunteering placement.⁴² Appendix V provides key characteristics of included studies.

Review findings

A total of 305 findings were extracted from the included twenty six studies (Appendix VI) and combined to form 28 categories based on similarity of meaning. Table 2 depicts the number of findings that are included in the categories and the categories that connect to each synthesized finding to illustrate the overall synthesis process. Appendices VII – VIII present each synthesis with accompanying categories and findings. Results are organised by synthesized finding and include a description of the categories, and a sample of findings the subtheme level and illustrations.

Table 2: Results of meta-synthesis of qualitative research findings

No. of findings	Categories	Synthesized findings
4	More time and consistency with students	The role of mentoring/preceptorship. Providing mentoring and preceptorship for undergraduate paramedicine students and paramedic interns was highly valued to reducing the transitional learning gap from the university environment to real life professional paramedic practice
7	Learning to work safety in the paramedic environment	
11	Coaching strategies paramedic preceptors feel are important	
20	Experiences of paramedicine sessional university educators.	
14	The introduction of a paramedic facilitator model	
16	What makes a good paramedic preceptor	
6	Communication and collaboration challenges	Opportunities to develop emotional intelligence and communication skills Aside from the technical/clinical skills required, paramedicine students will also need to develop skills/capacity in dealing with the emotional side of paramedic practice which includes communicating with patients, family members and other health professionals
7	Emotional regulation and psychological support	
4	Suppressing, surface acting and hiding emotions	
5	Personal growth and student collaboration	
4	The effect of life experience on undergraduate paramedic student's placement	
4	Value of inter-professional collaboration	The role of non-traditional placements/experiences Great value has been found in the development of the paramedicine student by utilizing non-traditional placements within the community and allied health environment.
3	Feeling underprepared for international placements	
8	Enhanced community awareness	

3	Increased confidence due to volunteering placements	
37	Clinical placements in nursing homes	
17	A wilderness experience for paramedicine students	
17	Paramedicine students working in medical clinics	
7	Paramedicine students undertaking action learning	The role of non-traditional teaching methods. <i>Utilizing non-traditional classroom teaching methods was found to have strong positive influences in students development of clinical reasoning, teamwork, reflection, self direction and problem solving.</i>
8	Utilizing reflective practice for paramedicine students	
7	Project-based learning in paramedicine student education	
13	The role of online learning	
7	The importance of the real life setting	Preparedness for practice <i>There were noted barriers and facilitators that effected the paramedicine undergraduate student and graduate paramedics preparedness for practice both during their undergraduate university programme and the graduate year.</i>
16	Barriers faced by paramedic preceptors while mentoring graduate paramedics	
23	Experiences of paramedicine students during ambulance placements	
22	Understanding paramedic professionalism	
6	Preparedness of graduate paramedics for practice	
9	Barriers found by paramedic preceptors/managers that effect paramedicine student's preparedness for practice	
Total findings 305	Total categories 28	

Synthesized finding 1: The role of mentoring/preceptorship

Providing mentoring and preceptorship for undergraduate paramedicine students and paramedic interns was highly valued to reducing the transitional learning gap from the university environment to real life professional paramedic practice. This meta-synthesis was created from six categories and seventy two findings. Studies clearly described ongoing demands of paramedic preceptors and paramedic sessionals wanting more time and consistency with paramedicine undergraduate students. Participants consistently reflected on the importance of good mentoring and coaching practices during undergraduate student placements and during paramedic internship. Participants from all studies felt that the real life setting was crucial to the learning experience and was where the most developmental opportunities existed, especially if they had good coaching and mentoring. Strong benefits were associated with the use of a paramedic facilitator model.

Category 1: More time and consistency with students

Four findings were combined to form this category, which captured the experience of paramedic preceptors. This participant group felt that time and consistency with students was imperative to their learning experience, teaching them both in university with sessional staff and during clinical placement with preceptors, to allow for feedback and development. They argued that short placements and a lack of continuity of educators were lost opportunities to engage with students in their clinical education. Paramedic preceptors described wanting time at the end of their shift to talk with students and debrief any critical incidents that may have occurred.

"We need time to provide feedback and do the paperwork. At the moment, the shift finishes and we have 10 minutes to sign the forms, shake hands and we never see them again." p.1082.

Category 2: Experiences of paramedicine sessional university educators

This category combined twenty findings showing paramedicine sessional university educators experienced barriers and facilitators while teaching in the university environment, barriers related to feedback, administrative expectations and overall support provided by the university. Although many interviewees mentioned that they felt valued and were often thanked informally by academic staff for their efforts, there was a distinct lack of constructive feedback on their teaching performance. Sessionals often reported difficulty in obtaining the information required for the smooth running of their class. There was much discussion regarding the need for more consistency in information about where the students are in their studies with regard to the curriculum, as well as departmental expectations. Sessionals felt they needed to learn how to teach, no training had been provided in this area, observation of other educators was

suggested as a method that could be employed to assist in learning how to teach. Facilitators expressed included the enjoyment they received from teaching the students, even though the financial rewards were not as great as working clinically. Another much cited facilitator of sessional teaching was that it was a way of staying current with information and continuing to develop professionally. The casual nature of the work was generally seen to be positive in the paramedic setting. Most reported having a good working relationship with the academic staff and were not aware of sessionals being treated in an unfair manner. Most expressed an interest in taking part in any future professional-development opportunities offered, and that their preferences were education and communication strategies in delivering learning to the students as they felt underprepared in this area.

"There should be some sort of training day, especially for the new sessionals...on how to teach... how to get the concepts across...and even to get some guidance on how [University name] permanent staff teach and how they try to get their message across." (Tony) p.4.

Category 3: Learning to work safely in the paramedic environment

Seven findings indicated that graduate paramedic preceptors felt a responsibility to i) ensure that graduate paramedics were safe when making patient treatment decisions and ii) play a role in teaching them to work safely when in unfamiliar and dangerous paramedic practice environments. Each participant reported feeling that they were responsible for the actions of the graduate paramedic in patient care decisions and were cognisant of their role in ensuring that graduate paramedics unfamiliar with the dangers of paramedic practice remained safe.

"Essentially the buck stops with us, being the only qualified operator in the car. And if something happens that compromises their safety it's pretty much our fault. We should be there to watch them like a hawk, so to speak." (Drew) p.8.

Category 4: Coaching strategies paramedic preceptors feel are important

Eleven findings portrayed that paramedic preceptors employed a variety of strategies that they perceived as adding value to graduate paramedic and undergraduate student learning and development. Preceptors used strategies representative of a coaching pedagogy such as of support, guidance and advice to facilitate students. Participants in this study expressed the importance of establishing an understanding of their preceptees as individual learners who have come to paramedicine with different backgrounds, skills and experience and the importance of role modelling by walking the walk to show the students best practice.

"If I say, 'Oh, you need to build a rapport with that patient,' then I go to the next patient and go, 'Come with me,' be abrupt and stern and not be patient, it's not going to – it's going to fall on deaf ears. So I guess it's like any leader. People learn from the leader's actions rather than their words. "(Chris) p.6.

Category 5: What makes a good paramedic preceptor

Sixteen findings recorded that both paramedicine students and paramedic preceptors felt that what makes a good paramedic preceptor involved appropriate preceptor training in mentoring and teaching. There was a desire to learn about mentoring from allied health professions who have established systems of education and mentorship. Preceptors felt they needed to be provided with support for their role both from the ambulance service and university sectors, they identified that they themselves may require a mentor, to ensure they have someone to go to when they are challenged by the role or require support. Preceptors felt that they needed a level of experience before taking on the role of mentoring students, expecting a paramedic to become a mentor immediately after leaving university was seen as asking too much. Recognition was also seen as an important facilitator to preceptor satisfaction; organizations were seen as not currently doing enough to recognize the role of the mentor. It was felt that staff members who become preceptors should genuinely be interested in teaching and had the time to work with students, an 'everyone is a mentor' approach was seen as resulting in a lack of depth in student education and placed an onus on individual paramedics, who may not want to be mentors. Preceptors also wanted to receive feedback from students about their effectiveness as a mentor.

"It would be very nice to have a situation where the mentors have a mentor to mentor the mentoring."
p.7.

Category 6: Benefits of a paramedic facilitator model

Fourteen findings indicated that both paramedicine students and paramedic preceptors felt that a paramedic clinical facilitator model might improve the quality of ambulance service clinical placements for both undergraduate paramedicine students and their preceptors, leading to a more positive learning experience. Both student and preceptor participants reported that, due to the preparatory work of the paramedic facilitator prior to the students attending their clinical placements, preceptors better understood the student's curriculum and learning outcomes for their clinical placements. Where possible, the paramedic facilitator introduced the student to the crew at the ambulance station at the commencement of their first placement. The facilitator re-enforced the capabilities of the students. Students felt increased confidence with this positive start. Students especially appreciated the opportunity to debrief and critically reflect after cases. This allows an opportunity to strengthen the learning from each

case, thereby reducing workplace stress, allowing students to perform at their best. Students and preceptors reported that while on clinical placement there were a number of incidents which had the potential to significantly impact student welfare. These included confronting and traumatic cases, preceptor hostility towards students, and stress and anxiety about workplace issues. The facilitator had a previously established trusting relationship with both students and preceptors, and was seen as trustworthy and approachable with sensitive matters. Preceptors utilized the facilitator as a referral and intervention point for student welfare post incidents, including debriefing, and access to further services. The facilitator, having prior knowledge of both the students and preceptors' backgrounds and personalities, instigated pre-emptive strategies to improve team coherence prior to any issues becoming apparent, such as re-allocating student to more willing preceptors. Students and preceptors found it advantageous having a designated point of contact between the university and ambulance service to manage the issues which inevitably occurred with the day to day management of student clinical placements. Overall, students felt supported in an enhanced educational relationship with the paramedic facilitator.

"You don't feel bad about saying, "Can you help me?" or, "This happened". The facilitator's job is for students. They come in and you're like okay cool, I've got this, and you don't feel bad. It's such a breath of fresh air when he walks in." – PSFG2, P14.

Synthesized finding 2: Opportunities to develop emotional intelligence and communication skills

This meta-synthesis summarizes twenty six findings grouped into five categories. Aside from the technical/clinical skills required, paramedicine students will also need to develop skills/capacity in dealing with the emotional side of paramedic practice which includes communicating with patients, family members and other health professionals. Creating resilience requires training, education, exposure and support; allowing for the building of capacity to deal with the emotional and interpersonal communication aspects of paramedic practice. The findings indicate a need for more emphasis being placed in preparing the paramedicine student for the challenges they will face in the emotionally demanding paramedicine environment.

Category 7: Communication and collaboration challenges

Six findings captured paramedicine students and paramedic preceptors reporting paramedicine students and graduates struggling with being able to communicate with patients, relatives and allied professionals. Participants felt the universities were failing in their role to supply graduates who were work-ready in non-clinical areas. Paramedicine students reported generally coping well, but sometimes struggling with

assertive communication. Students described situations which necessitated responding to patients' and relatives' feelings of fear, anxiety and uncertainty in highly stressful circumstances. Graduate paramedic preceptors talked about novice graduate paramedics frequent struggle with their interpersonal communication skills, especially early in their transition to practice. Graduate paramedic preceptor's also reported a lack of inter-professional collaboration skills on the part of the graduate paramedic.

"So interacting with triage nurses, bedside nurses and doctors when you have to give a handover. And just being confident in yourself and talking in a good, loud, strong voice, trying not to stop, um, ah and those sorts of things. And she (graduate intern) agreed, that it's not really anything that they teach them or they don't usually teach them a lot of those things at the university. It's a lot of clinical stuff, it's a lot of anat/phys, skills-based, not really interpersonal communications. And it's something that takes a long time to develop. I don't think you can really teach it in a classroom. "(Alex) p.5.

Category 8: Emotional regulation and psychological support

Seven findings showed that paramedicine students and graduate paramedic preceptors recognized the importance of being able to deal with the emotional challenges associated with paramedic practice. Graduate paramedic preceptors recognized the need for providing psychological support to their novice, which also includes knowing when to escalate support to professional services. The personal relevance of experiences to the paramedicine students during ambulance placements appeared to evoke strong emotions and feelings of empathy for those involved, struggling at times to control their emotions and to stop themselves from crying. Paramedicine students described the need to focus on the job or protocol appeared to detract attention from the person and contributed to a lack of realization that this was a person or patient. Paramedicine students also emphasized the behaviors of mentors who were potent role models in the management of emotion, paramedicine students felt they had a professional responsibility and the need to deal with the situation.

R2: "I did get emotional, I did actually think I was going to cry I did have to hold it back, he goes am I going to die and I turned round to the PCR (patient clinical record) and I did have to hold back, I got a bit choked up, I think all three of us did." p.516.

Category 9: Suppressing, surface acting and hiding emotions

Four findings indicated paramedicine students found themselves having to suppress or hide their emotions and at times 'surface act' to deal with the emotional side of paramedic practice. Respondents made reference to the need to control, hide and suppress their emotions. Another respondent describes surface

acting or hiding emotions and the importance of this as part of the job. The respondents referred to the expectation to manage emotion and the negative attitudes towards the expression of emotion. Some respondents suggested that being practically involved in the resuscitation helped to suppress their emotions. Paramedicine students found themselves in situations during clinical placements on ambulances where they had to suppress their emotions to continue on during cases and the negative reaction to expression of emotion in ambulance culture.

R4: "You've got this stature that you should not be that emotionally involved and you don't want to come across to them that you're not a whimp but that you're stressed or whatever, 'if you can't handle the job you shouldn't be doing it'. Um a classic line on the road 'you knew the job when you took it on'." p.515.

Category 10: Personal growth and student collaboration

Five findings reported enhanced personal growth of paramedicine students and collaborating with other students as benefits associated with overseas paramedicine placements. Personal growth in a non-academic, non-clinical sense was a strong theme that was valued by the participants as being just as important as the clinical experience. It was apparent that the combination of pre- or post-placement independent travel and the placement experience itself had a profound impact on most participants. The need to be self-sufficient and work as a team with fellow students in the same location was a strong theme. Students reported leaning heavily on the other students they were placed with, especially when off shift via constant debriefing and sharing of experiences. Students also emphasized the importance of sending students overseas in small, compatible groups, indicating that without this structure the experiences would have been less positive.

"You're out of the country, you're by yourself, you have to learn to do it all yourself, like, you obviously have support through the people that are in the same area of you as well as you can contact family, but – but you can't always go back to that, you have to learn to deal with stuff yourself which is a big advantage especially in this, like, in this career." p.191.

Category 11: The effect of life experience on undergraduate paramedic student's placement

Four findings showed paramedicine students with more life experience found that they adjusted to clinical placement well utilizing their communication and team work skills. Mature students made links with attributes to age and previous experiences in relation to practice engagement and felt that this programme was the last chance to achieve goals due to financial constraints and age. Mature students reported about

the positive aspects of their age, in fact they were protective of the fact; it is evident they feel this, in conjunction with life experience offers them credibility with staff.

"Mature students are likely to have been in the working world and will have got used to the idea of working."
(Participant FG). p. 589.

Synthesized finding 3: The role of non-traditional placements

This meta-synthesis summarizes eighty nine findings organized into seven categories indicating great value has been found in the development of the paramedicine student by utilizing non-traditional placements within the community and allied health environment.

Category 12: Enhanced community awareness

Eight findings were grouped together with paramedicine students reporting an increased awareness of the community as a result of volunteer placements. Students were unaware of the prevalence of various community issues, such as mental health problems, drug and alcohol addiction, and homelessness. Students also commented on the value to individuals from these communities in regard to the gift of time, an opportunity to chat, a shoulder to lean on, and someone to listen to them. A number of students felt their volunteering experience highlighted prejudices and stereotypes that they were previously unaware they held. The distinction between personal beliefs and the way you treat those around you was also highlighted. Students reported gaining the personal reward of helping out in the community, a sense of improved connectedness to the community and a reinforced desire to help people through paramedicine. Students commented on the value of volunteering in regard to improved employability.

"[Volunteering has] influenced the way I behave and the way I think generally . . . the ability to distance [your subconscious biases] from the way you treat the person is something I . . . learnt from my volunteering experience." p.194.

Category 13: Value of inter-professional collaboration

Captured in four findings paramedicine students felt they benefited from placements with other allied health care professionals. Participants talked about how students from different professions and clinicians work together to deliver patient care. Positive interprofessional student collaboration interactions were thought to lead to better patient care (eg, patient safety, patient dignity and positive patient experience). Participants reported that paramedics are able to be employed across a range of roles that are not only emergency ambulance based, creating a need for both ambulance and non-ambulance placements.

"It could be to do with teamwork and communication, and discharge planning, and joint assessments and paperwork." (Paramedicine clinician, F4PT2C2) p.4.

Category 14: Feeling underprepared for international placements

Three findings grouped together showed paramedicine students undertaking overseas paramedicine placements on ambulances reported feeling underprepared in terms of knowledge and interaction with patients. Students reported they believed a greater knowledge of pathophysiology and pharmacology, and a high level of pre-placement patient contact, would have enhanced their experience. Students reported that the expectations of knowledge and scope of practice held by their respective mentors surpassed what they felt they were capable of, and led to students experiencing intermittent feelings of 'helplessness' and 'frustration within themselves'. Students reported that the international placement should not be undertaken as the first clinical experience. This feeling was strongest amongst the Australian students sent to South African, but was still prevalent in the Australian students sent to New Zealand.

"there was (sic) too many times that I was left on-scene feeling useless and, um, ah, like I was basically taking up space". p.192.

Category 15: Increased confidence due to volunteering placements

Three findings indicated that paramedicine students felt that the experience of being on a volunteering placement greatly enhanced their confidence. Students identified skills or discovered aptitudes in areas they previously thought they were weak in. Students reported improved confidence with communication, particularly when interacting with people from a range of backgrounds and in a non-clinical environment. They felt they improved in their ability to build rapport quickly and felt increased confidence in leading paramedic cases on clinical placement involving mental health crises, drug and alcohol affected people, children (particularly those with special needs), and aggressive patients.

"Confidence in talking with patients frankly, on a person-to- person level, not always on that clinician-patient level . . . to make them feel more at ease, more comfortable, and I have no doubt [my volunteering experience] was a big help for that." p.194.

Category 16: Clinical placements in nursing homes

Thirty seven findings reporting on barriers and facilitators experienced by undergraduate paramedicine students and their preceptors/mentors while on placement in nursing homes. Barriers identified included organizational issues such as student participants being unaware who their mentors were and mentor participants reporting that they haven't been introduced to the students as a mentor. Many students felt

the education sessions on placement covered topics they had addressed previously in their course, a number of students reported they had limited engagement with residents during their placement and noted this was a weakness. Students reported problems with the placement structure, in particular with their timetable. Mentor participants felt students needed to show initiative and let staff know if they were unsure of what they could do to facilitate their learning. Students considered another weakness of the placement was what they perceived as limited interaction with nursing staff.

Students also expressed the view that staff struggled to recognize the skills they brought to the clinical area, some students reported that RACF staff perceived the students' presence in the facility to be an inconvenience. Students reported that they had very limited contact with their tutors while on placement due to the school having a limited capacity to provide paramedic tutors across the two facilities. Students and mentors reported the lack of appropriate geriatric assessment tools for paramedicine students they could use while on placement. Students considered much of the placement was geared towards medical and nursing students and this represented a missed opportunity to provide insights into what paramedics do. Some students said they struggled to see the relevance of many of the activities they were involved in during the placement to their work as paramedics.

Facilitators to learning reported during placement included student's relating the relevance of the placement to their future work as paramedics where they would increasingly have contact with people with dementia in a range of settings. Paramedicine students working with first-year nursing students on a IPL activity found it was a good opportunity to provide guidance and advice to the novice nurses. Students considered the placement to be valuable and commented specifically about opportunities to spend time with residents and learn how to deal with different patient behaviors.

Students reported a better understanding of the differences between the nursing and paramedic professions and they enjoyed teaching nursing students about paramedic practice. Students recounted how the nurses taught them useful strategies to engage with people with dementia during the performance of technical activities, this was helpful for developing their clinical practice by learning from other medical professions and being surprised by the positive interaction they had with medical students. Students reported that the placement helped them better understand the day-to-day workings of a facility and also served to help break down preconceived ideas some had about such facilities. Students expressed that the concept of dementia palliation challenged them to consider this issue from different perspectives, developing their communication skills and understanding the skills needed for working with older people more generally.

Students reported that the manual handling component of the placement was helpful, they were involved in a range of activities while on placement that provided them with the opportunity to develop new skills, develop an understanding of the unique environment of RACFs and the contrast between other healthcare settings with which they were more familiar. Students felt that the nursing staff were able to identify the skills of student paramedics and were keen to involve them in various aspects of resident care and building rapport with clinical staff was viewed as an important part of the placement experience and influenced student learning. Overall paramedicine students benefited from placements in nursing homes increasing their clinical skills, communication skills and enhancing their inter professional relationships.

“A huge proportion of a paramedic’s job is working with the elderly, not necessarily in nursing homes, so that opportunity to interact with the elderly is good.” (BP2012). p.403.

Category 17: A wilderness experience for paramedicine students

Seventeen findings were collated showing that paramedicine students gained many benefits by attending a wilderness experience including enhanced teamwork, leadership and interpersonal experiences. Students recognized the existence of competitive personalities in teams and its effect on team work, the behavior of whom unsettled interpersonal relating and stymied accurate, reliable decision-making, from this they learned the importance of appropriate interpersonal communication, in this case, restraint and silence. Students quickly realized that the unfamiliar environment challenged them all equally and they needed to manage their own unease and be sensible and reliable within the team, that is, to demonstrate maturity, respect and tolerance.

Teams were occasionally under physical duress during simulations, in such situations some members stepped up to show a level of strength and resilience not previously seen by their teammates. Students felt that being in the middle of the bush having to improvise and think outside the square gave them greater confidence, being in a completely different environment and putting everyone out of their comfort zone is a great equaliser. Students developed tolerance for, and acceptance of, others in the team, expressing a new respect for team members with whom they had little familiarity and developed a growing awareness and respect for teamwork. Students expressed that they learnt from each other when working in a team environment and showed a self- awareness of their contribution to the team while developing new skills and leadership. Students recognized themselves as belonging to a community of health professionals, and their first steps towards understanding the strength gained from professional identity. They showed an awakening to the professionalism in other team members and felt a greater accountability for their own

practice, and responsibility for the welfare of members of their team. Overall students learnt the importance of the inter relationship between communication, team work and leadership.

"I think I learnt more about communication, team work and leadership than I did about my clinical skills. It became obvious... that leadership is very important and communication/team work is vital to good care. I felt that... you don't understand how important it is until you are in that situation" (Field Diary). p.579.

Category 18: Paramedicine students working in medical clinics

Seventeen findings focussed on paramedicine students working in overseas medical clinics. Facilitators included working in a multi discipline environment, clinical exposure to patients and relatives and greater autonomy in clinical practice. Students reported enjoying the clinical challenges provided when effort was made to be actively involved, increasing their ability to work in stressful situations and learning skills in dealing with their emotional and personal feelings when supporting patient's relatives. Students reported an increased cultural awareness, cultural respect, and global citizenship and learning to communicate with family members who did not speak English in stressful situations. Students found the challenging nature of the environment to be both rewarding and humbling. Students believed that the placement was seen as an opportunity to improve their job prospects with an alternative employer other than a state-based ambulance service.

Students were surprised to be afforded acceptance into the team compared to their experiences on traditional ambulance placements and found their university studies prepared them to manage major trauma. They were afforded greater respect by the clinical staff after proving their ability under stress and that it provided them with an understanding of how multidisciplinary teams operate. Students reported that during down time they were able to shadow ski patrol and got to experience the challenges of providing trauma management to patients in the alpine setting and developed their professional networks with clinic staff. They felt that undertaking an international placement enabled them to build maturity which would assist them to transition to the workplace. Barriers reported were feeling unprepared working for a team of health professionals who had not necessarily worked together before and did not know each other's capabilities and that medical cases were too limited, with the caseload being mainly traumatic injuries. Overall the students found placements in medical centres a positive developmental experience and highly recommended the placement to future student cohorts.

"working in an environment that is challenging though beneficial, rewarding and humbling." (Respondent 1) p.24.

Synthesized finding 4: The role of non-traditional teaching methods

This meta-synthesis summarizes 83 findings divided into 6 categories indicating the utilization of non traditional classroom teaching methods was found to have strong positive influences in student's development of clinical reasoning, teamwork, reflection, self direction and problem solving

Category 19: Paramedicine students undertaking action learning

Seven findings showed paramedicine students increased their clinical knowledge and team work experience by applying action learning to reflecting on cases attended while on placement. Students identified how being involved in action learning allowed opportunities to clarify uncertainty within the practice setting and allowed them to discuss cases they were not sure about. Students reported that action learning made them feel at ease because other students were having similar problems, it was like a form of group therapy and it resolved series issues. Students felt that action learning allowed for the discussion of cases students had struggled with, issues on ambulance stations and university. Students also reported that sometimes clicks within action learning groups affected the overall benefits to all students involved. Action learning was found to have many facilitators relating to developing clinical knowledge and its relationship to practice, while enhancing student's capacity to work in a team.

"That we all had issues that we brought to the table, whether they were jobs that we had been to that we struggled with or issues on our stations or university and we all discussed them [as part of the AL process].." (student 3). p.630.

Category 20: Utilizing reflective practice for paramedicine students

Eight findings indicated that great value was found by paramedicine students engaging in reflective practice to develop their clinical knowledge and practice. Students reported the importance of reflective practice, its influence on creating change, they found reflection to be useful, felt that it helped to improve their practice, and they discussed their reflective ability improving the more they utilized it. Students highlighted that reflection could be used to deal with feelings if they had experienced an upsetting case and felt they needed to talk it through and that negative triggers seemed to be the most common prompt for reflection. Students reported perceptions and viewpoints of reflection appeared to be affected by their educational experience, they were confident that they would use reflection in their future practice.

"I think it has definitely made me a better clinician. By reflecting on what I didn't do well or [when] I was happy with what I was doing, I have been able to look at my practice and make improvements, and I have become a better clinician because of it" (P6b). p. 260.

Category 21: Project-based learning in paramedicine student education

Seven findings involving project based learning showed many facilitators to learning for paramedicine students and staff including increased team work, enhanced communication between students and staff and more student independence and self direction. Participants spoke of how the typical student-teacher relationship had been rearranged and that the students influenced the academic in their own learning and teaching. Participants emphasized that the positioning of the teacher as a facilitator rather than the controller is an important point and allows more student ownership. Participant also reported the importance of open communication and respect between teacher and students and the importance of guiding students in the understanding of team work and being part of a team. Participant noted the value of teaching outside of the box approach to increasing student's self direction and independence.

"All of a sudden I was watching people's body language around the room, and I ... thought wow, there's something really magical going on here ... So I was watching the back and forth, and I thought this is really something, there's a realignment going on here ... and here's the students showing us how they view it." (Academic) P.3.

Category 22: The role of online learning

Thirteen findings showed paramedicine students found several facilitators and barriers while using case based learning in an online environment. Facilitators included that case based learning gives them the ability to relate theory into practice, helped them remember pertinent points as it related to real situations and allowed them to look at the case from all angles and bring different ideas into play. Students felt that case based learning helped them make sense of lecture material due to relating it to on road clinical practice. Online case based learning allowed them to search the web during the session to get more information, post responses at any time of the day or night, fit it in with other work commitments, to be self directed and gives the chance to share information. Students did indicate that in person case based learning was more effective as it allowed for an immediate exchange of information.

Reported barriers included that with online case based learning there was no face to face interaction causing less motivation to engage during the session and there was no opportunity to receive instant feedback about questions. Students found that online case based learning made it difficult to access information if the Internet was not available at home and they often found it difficult to be online.

"CBL gave us the opportunity to see where the theory in lectures fitted in with real world cases" (BEH 3rd year student 16) p. 4.

Synthesized finding 5: Preparedness for practice

This meta-synthesis summarizes thirty five findings divided into four categories indicating there were noted barriers and facilitators that affected the paramedicine undergraduate student and graduate paramedics preparedness for practice both during their undergraduate university programme and the graduate year.

Category 23: The importance of the real life setting

Seven findings related to the importance of real life settings during learning and development for paramedic practice. Paramedic preceptors consistently described their role in the learning and development of a graduate paramedic as being focussed on the novice's practice-in-context. Paramedic sessional's felt that the simulation environment at university does not provide the opportunity for students to learn to engage with real patients in a sensitive and empathic manner. Graduate paramedic preceptors recognized providing clinical care in a person's home often provides paramedics with a wealth of information on psychosocial impacts of their patient's health and wellbeing which can be passed onto medical staff. It is an important dimension of assessment to emphasize to their neophyte practitioner, offering quite different insights to those experienced in clinical simulations at university. Paramedicine students felt that the more exposure they got the better, with their preceptors also reporting that students needed exposure to the work environment.

"They have this million dollar SIM room where they walk in and there's a mannequin lying on the ground and it coughs and vomits and talks to them, but they don't really have that chance to build a rapport, to communicate with the patients, understand body language or verbal cues, non-verbal cues." (Alex) p.4.

Category 24: Barriers faced by paramedic preceptors while mentoring graduate paramedics

Sixteen findings involved paramedic preceptors reporting barriers while providing mentorship to paramedicine graduates including a lack of being job ready and the ability to work unsupervised. Preceptors perceived a gap in the implementation of skills as part of the clinical reasoning and decision-making process. Preceptors noted that graduates often did not get placed with mentors and there remained a need for newly employed graduate paramedics to be oriented into the ambulance service organization. Preceptors identified that a newly-graduated paramedic would be very unlikely to operate effectively as an independent practitioner and that no matter how long students spent on clinical practicum, paramedic graduates required a period of supervised practice before being allowed to practice independently. Preceptors views on the length of the supervised practice period after graduation varied and the speed of

graduate integration was suggested by interviewees to be multi-factorial and related to the individual's maturity, past work, and their ability to work in a high-pressure ambulance environment. Preceptors reported that the complex clinical environment paramedics operate within was also identified as a significant challenge while teaching students new skills and being concerned that the current infrastructure not adequately supported students to cope with situations they are faced with. Preceptors reported that graduates were not work ready, lacked commitment, the right disposition or a willingness to take up the demands of the job such as shift work. Preceptors reported chauvinistic and non-inclusive attitudes and poor empathy with the elderly were identified as a problem among students. Preceptors spoke of the value of psychometric testing for predicting a graduate's suitability for the work and that some staff were distrustful of university educated paramedics. Preceptors reported the need to respect patient autonomy and rights and the importance of focusing on people rather than non-human resources.

"Each university teaches differently and there is no consistent minimum skill set – so have to teach additional content based on the university the graduate goes to." (Australian paramedic interviewee) p.5.

Category 25: Experiences of paramedicine students during ambulance placements

Twenty three findings illustrated many experiences by paramedicine students during ambulance placements including poor mentoring, lack of consistency with mentors and short placement duration. Students reported feeling frustrated by a perceived lack of communication between the university and the ambulance service staff who would be supervising and teaching them and that paramedics unknowingly cast students as "observers" rather than "participant observers".

Students indicated that they were placed in an awkward position whereby they needed to state their learning objectives and outcomes at the outset of their placement and the placement location as a significant influence on their placement experience. Some students explained despairingly that over the course of their placements they had not acquired practical experience of major emergencies while others had a diverse range of experiences, students based in metropolitan sites who constantly changed sites and supervisors did not cite added learning advantages. Students also noted that they required information about peer support during placements, wanted more and/or longer clinical placements and that the nature of rural paramedic work meant the number of call outs is typically significantly less than in metropolitan areas.

Students reported the need to change the language around how a student perceived their role on a case. 'Lead with job' was replaced with 'lead with assistance'. Students that came from the mature sample who

had previous workplace experience reported that when making mistakes they felt like they had let themselves down, they felt the constant pressure of having to achieve academic study outcomes, and that they had settled into placement far sooner than the direct entry students.

Students in the direct entry from high school sample felt the HEI route to paramedic registration was not fully understood by mentors who had not come through the university pathway. They reported there was a significant lack of understanding about what it aimed to achieve, they specifically placed considerable emphasis on their ability to get on with people, they felt it was important to get involved and reported that direct entry from high school students can have a great deal of experience and maturity which can unsettle ambulance staff. Direct entry students from high school discussed learning during placement if they came across something that they had not previously seen, or did not understand, felt uncomfortable with some paramedic staff on stations who had not become a paramedic through the university stream and were keen to express their need to learn in contrast to mature entry students are more focussed on doing the job. Direct entry students reported that they had all, at some stage experienced some negative interaction from colleagues or patients commenting on their age and that age was not necessarily a reflection of life experience. A common aspect reported by both sample groups was being ignored by a patient when working with older clinicians.

"Sometimes they weren't even expecting that you were coming. ... Half of them don't expect you. ... You turn up at 7 am and they say who are you? ... The branch gets the form [student placement notification] but the actual workers, who are on that day, I'm not sure if they look at the form." [BEHP student, final placement] p.4.

Category 26: Understanding paramedic professionalism

Twenty two findings found paramedicine students and paramedic preceptors felt it was important to gain an understanding of professionalism. Preceptors identified that it was part of a paramedic's role to assist, educate and train the future workforce, practising in ways that do not discriminate against patients was important, that professionalism was a combination of behaviors, attitudes and personal experience. Preceptors reported that having a university basis of education is an important part of being a profession, education in professionalism was important, and professionalism is about acting in a manner that creates trust and confidence in how you are practising. Preceptors referred to the importance of integrity, adaptability and awareness of limitations and they suggested that the commitment of individual paramedics to improving their practice is important and they need to take personal responsibility for their professional standards. Preceptors felt that leadership and accountability were important professionalism

enablers, that it is a joint responsibility to promote professionalism by both the organization and the individual as well as the importance of a professional regulatory body to enhance professionalism. Preceptors talked about the need to maintain skills as a personal professional responsibility not just an organizational one, the importance of a professional code of values to adhere to, although not all paramedics embodied these values and the importance of culture and the challenge of creating change within paramedic culture. Preceptors felt that poor organizational management, communication and staff support affects the professionalism of paramedic staff and being unsure about having a registered body necessarily helped you become a professional. Student paramedics reported that team work is an important part of professionalism, they thought that professionalism is about communication, attitude and commitment to learning, that professional presentation to patients is important and can improve your personal pride and highlighted the importance of a regulatory body as part of professionalism. One student paramedic recalled an incident where she thought a paramedic demonstrated professionalism due to not judging low acuity patients that didn't require emergency care.

"Quite difficult to define in a nutshell. I think it incorporates lots of different things such as communication, attitude and commitment to your learning in the paramedic context." (student paramedic). p. 3.

Category 27: Preparedness of graduate paramedics for practice

Six findings identified graduate paramedics found facilitators and barriers that affected their preparedness for practice during their time as undergraduate paramedicine students. Graduate paramedics indicated an appreciation of the fact that learning is a continuum and that it will consolidate and continue on the job, they did not feel prepared, and articulated the value of learning on the job once they began work. Graduate paramedics commented that clinical practice sessions are what were the best aspects of the course in preparing them for work as a paramedic, they found ambulance service placements were useful during the course in preparing the student for entering the ambulance workforce. Graduate paramedics reported a need for practical training and placements in mental health and the need for greater tailoring of units to paramedics.

Category 28: Barriers found by paramedic preceptors/managers that effect paramedicine students preparedness for practice

Nine findings showed that paramedic preceptors and managers found several barriers within paramedicine undergraduate programmes including lack of clinical skills and poor clinical decision making that effected paramedicine students preparedness for practice.

Areas identified by Australian participants as being well taught included anatomy and physiology, treatment modalities and rationale for treatment however students were found lacking in the application of skills learned. Participants reported disparity across Australian university paramedic degrees with respect to the suite of skills taught to students. Both Australian and UK participants suggested that the length of time spent on ambulance placement with a paramedic crew did not necessarily result in optimal case-mix exposure for learning purposes. Participants suggested that some graduates undertook practicums in primary care, alcohol and other drugs, mental health, aged care, emergency departments or overseas practicums and identified that the level of responsibility given to students on placement varied widely. Participants suggested the principal reason students failed to develop their decision-making skills was because during practicum placements there was always a fully qualified paramedic taking responsibility for the patient. Participants reported that students could be placed on ambulances as a second during their third year to increase their exposure to clinical decision-making while still under supervision and teaching clinical skills in context. Participants suggested for students to work as ambulance transport officers in order to gain the necessary pre-employment skills.

Discussion

This systematic review of qualitative evidence was undertaken to better understand the learning experiences of undergraduate paramedicine students, graduate paramedics and the teaching experiences of their preceptors/educators. The role of a paramedic is difficult to define in the international environment. Generic terms like 'emergency medical technician' and 'learning' were necessary due to the relatively new nature of the term paramedicine and language limitation of the field.

Twenty six studies,^{8,19,20,25,38–58,60} were included in the review after an exhaustive search and inclusion process. Participants from three countries yielded qualitative descriptive data. The confidence of the evidence, using ConQual, was interpreted for the five synthesized findings; overall all were rated as moderate. The 305 findings gave rich and expressive information on the facilitators and barriers to learning in the paramedicine domain, from both participants receiving learning and those responsible for delivering learning.

Five synthesized findings were developed from twenty eight categories giving us the contemporary experiences of paramedicine undergraduate students, graduate paramedics, paramedic university educators, paramedic student preceptors and graduate paramedic preceptors. Both in the university sector and the real life setting of paramedic practice.

Due to the professionalization of paramedicine there has been a shift to University education in Australia, New Zealand and the UK. With this shift comes challenges and tensions related to ensuring the preparedness of graduates and achieving the right balance of developing technical/academic knowledge and clinical placement experience.^{9,61} This move has left us with a vast amount of experiences of those involved that has given this review a rich source of information. It is clear that many facilitators to learning were lost in this transition and new barriers created that have often been offset by novel non traditional approaches to learning.^{9,10,12,61}

The results of this review give us opportunities to influence change within paramedicine learning allowing the development of more meaningfully structured undergraduate paramedicine programmes that meet the contemporary needs of paramedicine students, graduates and those charged with their development. Moving the profession forward by utilising the latest research findings incorporating an evidence based approach to prepare the future workforce for practice based on the experiences of those who have journey before them. There have been many challenges to paramedicine learning that have occurred since the change from vocational training in the nineties to tertiary education required to move the role to professionalism. It is important we view paramedicine learning alongside health education as well as its unique place within health.

Evolving the paramedicine education paradigm

Paramedicine undergraduate degrees need to incorporate learning that meets the needs of the student, robust programs that realistically prepare the student for the rigors of paramedic practice, incorporating real life learning that not only builds their technical skills but also their emotional resilience and capacity to communicate effectively.⁸ Programs that facilitate the development of team work and leadership skills, utilizing an evidence-based standardized approach to undergraduate paramedicine curricula that gives all students the same opportunities. Incorporating non traditional classroom teaching methods showing the influence of reflective practice, action learning, case based learning and project based learning. These non traditional dynamic teaching practices delivered in undergraduate paramedicine courses showed many positive influences on student learning, including enhanced teamwork, independence, communication, clinical reasoning, problem solving and self directed learning.^{38,39,50,56}

Supporting the transition from student to professional

The preparedness for practice of paramedicine students featured consistently in multiple studies where there were noted barriers and facilitators that effected the paramedicine student and graduate paramedics preparedness for practice both during their undergraduate university programme and the graduate

year.^{19,45,48,55,57,58} Students and preceptors felt that more emphasis should be placed on utilizing the real life setting. Students felt they needed more placements on ambulances and within mental health facilities to gain more realistic knowledge.^{48,55} There was a strong consensus that the gap between the university environment and the real world of ambulance practice was too great due to a focus on academia rather than job preparation. This gap often created barriers and challenges for students entering graduate programmes feeling underprepared for the workplace.^{45,48,55} This was supported by the view of paramedic preceptors who felt that graduate paramedics were underprepared for practice, specifically in their clinical skills and capacity to communicate, especially in emotionally charged situations.^{19,45,55}

There is clearly tension between ambulance services and the university sector in what qualifies as a job ready graduate.⁹ Australian ambulance services have a graduate paramedic programme from six to twelve months long of supervised practice due to graduates not being deemed job ready.^{9,13} The view of whether a new graduate should be job ready varies depending on which side of the fence you sit. There is a view that in order to make students more “job ready” through experiential learning opportunities there will be a potentially significant increase in university costs (i.e. increasing placements incurs additional cost related to student insurance and placement fees to some ambulance services). The opposing view is that if students are not sufficiently prepared after graduation that the cost will be incurred by the ambulance service who believe they need to provide a graduate programme and additional supervision and off roster training.

The UK has a minimal transition to unsupervised practice. This occurs through a short induction course and then graduates work as qualified paramedics as the senior officer working with an emergency medical technician. It must be noted that in the UK it is mandated that paramedicine students spend 50% of the undergraduate degree in a real life clinical practice environment.¹³

An Australian study on paramedic graduates who moved to the UK found that they were underprepared for the UK system as it did not offer a graduate programme. Australian graduates struggled and were shown to have a large transformational learning gap especially in hands on clinical skills and overall practice experience.¹³ There is currently no mandated minimum clinical practice hours for Australian students or how they should spend those hours.^{9,13} Clinical practice hours vary substantially from university to university starting at less than 300 hours to a maximum of 800 hours. This is in comparison to the UK system, which equates to approx. 2200hrs.¹³

Mind the Gap: the importance of “real world” experiences

Placing undergraduate paramedicine students in other clinical environments outside the usual ambulance setting showed multiple benefits to learning. Innovative programmes that placed students with other allied health professionals encouraged them to gain an understanding of patient care in a holistic sense and challenged students to work in different environments, enhancing communication skills with patients and other practitioners in multiple settings.^{25,41,44,46,49,52} These placements would be considered “non-traditional”, like community volunteer placements provided by one Australian University.⁴² Students did placements with the Salvation Army and youth workers, gaining an increased awareness of the community as a result of volunteer placements, such as mental health problems, drug and alcohol addiction, and homelessness. Students gained insight into prejudices and stereotypes that they were previously unaware they held, learning the distinction between personal beliefs and the way you treat those around you. They gained personal rewards due to helping out in the community, improved connectedness to the community and a reinforced desire to help people through paramedicine.⁴² Students identified skills or discovered aptitudes in areas they previously thought they were weak in, improving confidence with communication, particularly when interacting with people from a range of backgrounds and in a non-clinical environment. They felt they improved in their ability to build rapport quickly and increased confidence in leading paramedic cases on clinical placement involving mental health crises, drug and alcohol affected people, children (particularly those with special needs), and aggressive patients.⁴²

Another Australian study exposed paramedicine students to a weekend wilderness experience. This study showed strong facilitators that developed students teamwork, communication, interpersonal skills, resilience and conflict management skills. Students during this wilderness experience felt they had increased confidence due to being out of their comfort zones and learning to problem solve. Most importantly students learned the importance of the interrelationship between team work, communication and leadership.⁵⁴

Two Australian studies showed the experiences of Australian paramedicine students undertaking overseas placements in medical clinics in New Zealand and Vanuatu. These studies showed many strong facilitators experienced by students including learning to work in stressful situations, dealing with their emotional and personal feelings when dealing with patients and relatives, and an increased cultural awareness. Although initially feeling underprepared for working with multidisciplinary teams they soon adjusted and enhanced their capacity to be part of a multidisciplinary team.^{44,49}

Three Australian studies involved paramedicine students doing placements in nursing homes. These studies showed that, although there were some logistical barriers like students not knowing who their

mentors were and not having a paramedic geriatric assessment tool, this was outweighed by multiple facilitators including learning to communicate with dying patients and their relatives, and building their overall communication and team work skills. They learned to deal with patient behaviors and conditions including dementia, they gained an understanding of how a nursing home functions and the difference between the nursing and paramedic professions, and the placement helped them develop their clinical practice as well as their interpersonal communication skills.^{46,52,53} Another Australian study showed the value of undergraduate paramedicine students undergoing allied health placements where they gained insight into other health care professionals learning to work together.⁴¹ These are strong positive developments from the experience of undergoing these placements, building confidence in being able to communicate and relate to challenging patients that would be a facilitator to offset some of the barriers identified in other studies.^{8,19,55}

The study conducted on students from an Australian university undertaking ambulance placements with South African and New Zealand ambulance services recorded some interesting findings.²⁵ On one hand students felt clinically underprepared for their placement, they believed a greater knowledge of pathophysiology and pharmacology, and a high level of pre-placement patient contact, would have enhanced their experience. Students reported that the expectations of knowledge and scope of practice held by their respective mentors surpassed what they felt they were capable of, and led to students experiencing intermittent feelings of 'helplessness' and 'frustration within themselves'. As the students themselves reported the international placement should not be undertaken as the first clinical experience. This feeling was strongest amongst the students sent to South Africa, but was still prevalent in the New Zealand cohort.²⁵ Sending students on their first placements to an overseas country seems like a jump too far so early in their programme, especially in South Africa which sees such a high level of trauma cases.⁶²

On the other hand, personal growth occurred due to students being sent overseas in small groups without a mentor so they had to rely on each other, learning to work as part of a team supporting each other and maturing as part of the experience. So the greatest facilitator to learning was the journey overseas with each other working in small teams learning to be self-sufficient, a theme that was valued by the participants as being just as important an outcome as the clinical experience.²⁵ It was apparent that the combination of pre- or post-placement independent travel and the placement experience itself had a profound impact on most participants. Students reported leaning heavily on the other students they were placed with, especially when off shift via constant debriefing and sharing of experiences. Students emphasized the importance of sending students overseas in small, compatible groups, indicating that without this structure the experiences would have been less positive.²⁵ This study showed an unexpected outcome that may help

students be better prepared for some of the other barriers identified in this review in regard to emotional maturity and communication.^{8,19}

Building emotional intelligence, confidence and communication skills in high demand/stressful environments

The need to build on the students and graduate paramedics capacity for dealing with the emotional challenges of paramedicine practice and the communication skills needed featured strongly, indicating a need for more focus on these areas during the development of student and graduate paramedics.^{8,19,55} This would better prepare them for the rigors and challenges they will face in this line of work potentially increasing resilience, job longevity and reducing the development of mental health problems.^{1,5-7}

Four studies, two Australian studies, two UK/Australian studies, one on undergraduate students in an Australian university, one on graduate paramedic preceptors with an Australian state ambulance service, and two on graduate paramedic preceptors in Australia and the UK found participants underprepared for the emotional and communication challenges they face while doing ambulance placements/ graduate shifts.^{8,19,45,55}

Often not coping with the emotional and clinical experiences they are exposed to when dealing with patients and relatives in the real life setting. Participants reported sometimes struggling with assertive communication, especially in situations which necessitated responding to patients' and relatives' feelings of fear, anxiety and uncertainty in highly stressful circumstances.^{8,19} Graduate paramedic preceptors identified the frequent struggle of novice graduate paramedics with interpersonal communication skills, especially early in their transition to practice. They also reported a lack of inter-professional collaboration skills on the part of the graduate paramedic.¹⁹ The importance of being able to effectively communicate is clearly identified in the findings as is the lack of preparation for the challenges students and graduates face when attempting to communicate with patients, family and other professionals.^{8,19,45,55}

The personal relevance of experiences to the paramedicine students during ambulance placements appeared to evoke strong emotions and feelings of empathy for those involved. Struggling at times to control their emotions, to stop themselves from crying, suppress their emotions to continue on during cases and dealing with the negative reaction to expression of emotion in ambulance culture.⁸ Students need appropriate preparation and emotional maturity before placement, guidance during placement and the opportunity for open reflection post emotional cases to understand suppressing emotions.^{29,45} Clearly provision for dealing with the emotional challenges a paramedic will have placed on them is a critical preparation requirement that needs strong emphasis in paramedic training and development.^{5,51,63,64}

Empowering students to be autonomous clinicians

Participants in many of the included studies (?) felt that the real life setting was crucial to the learning experience and was where the most developmental opportunities existed especially if they had good coaching and mentoring.^{19,20,40,45,55,57} Not having a consistent sessional educator at university or paramedic preceptor during placements on ambulances are lost opportunities to develop learning bonds to engage with students in their clinical education. The lack of capacity for student paramedic preceptors to have time at the end of their shift to talk with students and debrief any critical incidents that may have occurred is concerning and may inhibit the learning value of the placement and effect the students well-being and overall development.^{12,18,57}

The relevance of the student having the same consistent mentor seems unequivocal to forming relationships over time that allow for the mentor to develop confidence in and understanding of the student to facilitate progression of skills. The importance of good mentoring both in the university environment and in the real life setting was consistently highlighted in multiple studies.^{19,20,40,45,47,55,57}

An Australian study and a UK/Australian combined study involving graduate paramedic preceptors showed they clearly felt a strong responsibility to patients to ensure that graduate paramedics made the right patient treatment decisions and teaching them to work safely when in unfamiliar and dangerous paramedic practice environments.^{19,45} The unpredictable nature of the paramedic practice environment was also highlighted and the challenges this presented for preceptors when having to monitor paramedic graduates practice and safety.^{19,65–67} The use of coaching strategies including support, guidance and advice, and the importance of establishing an understanding of graduates as individual learners was refreshing to see in this study.^{19,45} The importance of the paramedic preceptor role is highlighted in these findings and begs the question of the lack of a national approach to standards for preceptor training in Australia.^{9,18,45}

The introduction of a paramedic facilitator model

The introduction of a paramedic facilitator model provided considerable positive experiences by both students and preceptors in its provision of coaching and mentoring.⁵¹ An Australian study on the introduction of a paramedic facilitator model aligned with other allied health student facilitator models showing strong benefits were associated with its introduction.^{68–70} This was the first known study on the introduction of a facilitator model in Australia for undergraduate paramedicine students during field placements on ambulances. The study showed multiple benefits from the views of the students themselves and their paramedic preceptor's and all agreed that the placement experience was significantly enhanced in all areas of the student's developmental needs. They had a nominated person who could support them with their relationship with their preceptor, and the emotional and communication challenges they had on

placement with patients, relatives and other allied professions.⁵¹

The facilitator was able to debrief and critically reflect with students after cases, allowing an opportunity to strengthen the learning from each case, reducing stress during placement, allowing students to perform at their best.⁵¹ The facilitator model showed that it had the capacity to deal with some of the barriers identified in other studies like opportunities to develop emotional intelligence, communication skills and dealing with suppressing, surface acting and hiding emotions.^{8,19,51} Also the lack of capacity for paramedic preceptors to have time at the end of their shift to talk with students and debrief any critical incidents that may have occurred.^{51,57,59} The absence of a permanent paramedic facilitator model for undergraduate paramedicine students seems somewhat of a quandary when it is considered standard practice within the allied health domain indicating a potential need for alignment to other allied health undergraduate degrees.^{68–70}

Evidence based health science learning

Empiric investigations of the science of learning come from many fields such as cognitive psychology, neuroscience, sociology, anthropology, and behavioural economics. The evidence brought forward in this review is supported by the growing application of this science of learning to the health professions. Gooding (2017) commented in ‘Twelve tips for applying the science of learning to health professions education’ about teaching health sciences students to “engage in structured reflection as they compare and contrast cases with similar presentations has been shown to improve both retention and transfer.”⁷¹(p. 28) Gooding also talked about how Ericsson (2015) “proposes that medical education adopt deliberate practice by creating libraries of cases for learners to engage with in repeated practice supported by a teacher or mentor.”⁷¹(p. 28) Gooding found that teaching with multiple varied examples allowed learners to perform a critical task of germane load, that is the creation of schemas (frameworks of memory in long term memory).⁷¹ This correlates directly to the findings in utilizing the non traditional classroom learning methods of reflective practice, case based learning, action learning and project based learning.^{38,39,50,56}

The importance of coaching and mentoring is also supported by evidence in creating learning orientated goals rather than performance goals.

Gooding talked about psychologists Elliott and Dweck describing students that were learning oriented as trying to improve their competence, see mistakes as a learning opportunity, and were less likely to disengage from challenging tasks. Rather than performance oriented students who set out to prove their competence, were more likely to disengage during challenging tasks and saw mistakes as failure. Gooding commented that “Teachers can help promote learning goals by framing assessments as opportunities to learn and improve on one’s relative weaknesses as opposed to opportunities to prove one’s abilities.”⁷¹(p.

28) The use of coaching strategies of support, guidance and advice, and the importance of establishing an understanding of their graduates as individual learners evidenced in this review reflect positively in supporting students to become learning oriented.^{19,45,51}

The concern is that facets of ambulance service culture and the academic pre learning environment can influence students to take on a performance orientation in those environments especially with poor mentoring depriving them of the best learning opportunities.^{8,51,57,58} Lave and Wenger emphasized “the importance of relationships and interactions between newcomers and old-timers or more knowledgeable others to frame learning as a dynamic process of guidance, support, and co-construction or reconceptualization of practice.”⁷²(p. 2). This also supports the findings within this review of the importance of good coaching and mentoring and the importance of the real life setting.^{19,45,51,54,55,57}

Gooding acknowledges that “learning does not occur in an individual vacuum. Individuals learn in interaction with the environment in a reciprocal, dynamic way; they interact with people, processes, attitudes, and beliefs related to the social culture. Social learning also draws on sociocultural theories from anthropology and sociology as an important part of health care education is socialization into the professional community of medicine. Finally, workplace learning draws on both cognitive and sociocultural approaches, with particular emphasis on situated learning (Yardley et al. 2012). The premise underlying situated learning is that learning is always situated or attached to the context in which it is learned.”⁷¹ (p. 29) This is also highlighted in the current review with the experiences of students undertaking non traditional placements/experiences overseas, with the salvation army, in medical clinics, nursing homes, allied health environments and the wilderness setting.^{25,41,44,49,52,54} O’Brien characterized Situated learning theory (SLT) as “embedded in everyday activity, context, and culture; fundamentally social; often unintentional rather than deliberate; and progressive with respect to learners’ participation . SLT offered new ways of conceptualizing and studying learning processes, particularly in non-classroom settings.”⁷²(p.2). These findings would not appear to be controversial rather logical in their presentation of the contemporary challenges facing the growing profession of paramedicine. They show programmes that have been developed by using innovative and holistic perspectives, utilizing a non-traditional approach to create broader learning and development opportunities.^{11,13,27,73,74}

Although a qualitative systematic review on this topic and its population has not been done previously the findings in this review are not necessarily all new to the world of paramedicine. The Australian health workforce report⁹, published in 2014, focused on changes required in paramedicine education including

making the best out of student placement experiences. Some of the recommendations developed in that report align with some of the findings of this systematic review e.g.

- “Instructors be allocated time to better prepare for the responsibility of supervising students, including appropriate clinical education or instructor training”.⁹(p.41)
- “Allocation of time at the end of each shift for the instructor and student to review and reflect on the placement experience, to debrief any particularly challenging activities from the shift and to complete the associated paperwork”.⁹(p.41)

All of the findings in this systematic review impact on the job readiness of the paramedicine graduate and their transition into practice. It is clear that some of the findings, like non traditional placements/experiences and non traditional teaching methods, have shown that these are facilitators that can make this transition smoother. These facilitators are not wide spread but in fact small in regard to the impact they currently have as they are not part of national programmes or curricula, indicating a need for the review of undergraduate paramedicine curriculum and graduate paramedic programmes.

The barriers identified have a relative consistency across all the studeis included in the review, again suggesting a review of undergraduate and graduate paramedicine programmes. There is significant potential associated with these programmes if ambulance services and universities are able to collaborate. Unless a unified national approach is taken by these two key stakeholder’s there is little chance of meaningful change.

Maloney (2017) in ‘The Prato Statement on cost and value in professional and interprofessional education’ when talking about health education costs commented that “developing a culture where educators take an interest in measures of cost and value allows them to make stronger arguments for desired changes and empowers them to have greater involvement in budgetary decisions (Walsh, 2016).”⁷⁵ (p. 3).

The need for change has been evident for some time and it seems little change has been implemented even with the registration of paramedics in Australia during this time. The new profession of paramedicine is perhaps yet to see the light in regard to the true meaning of being a profession, one that stands on its own two feet, understands the importance of creditable research and its translation to professional practice, particularly in relation to paramedicine education, this seems reflected in the lack of indexing of paramedicine journals in the major search data bases. It seems we need to save ourselves from our own cultural influences of our past to truly become a profession.

O'Meara made comment that "Clinical instructors raised several issues of concern about the organisational culture of the ambulance services in relation to student clinical placements and education in general".⁹(p.40)

This culture is often not supportive of undergraduate paramedicine students as they are not seen as employees, unfortunately this may be reflective of the fledgling nature of the paramedicine profession as its not yet seen as a professional responsibility to mentor students. Paramedicine needs to understand that it has a professional responsibility to raise the next generation of paramedics and not see them as a burden. Mylopoulos (2016) sums it up well in 'Preparation for future learning: a missing competency in health professions education?' "Preparation for future learning and the associated capacity of being adaptive as one learns in and from training and clinical practice have been missed in most contemporary training and assessment systems. We propose a research agenda that (i) explores how real world adaptive expert activity unfolds in the health care workplace to inform the design of instruction for developing PFL, (ii) identifies measures of behaviours that relate to PFL, and (iii) addresses potential sociocultural barriers that limit clinicians' opportunities to learn from their daily practice."⁷⁶(p. 115).

It is clear that we can learn a lot from our colleges in other health professions in the educational journey they have taken to professionalism, their contemporary challenges and available evidence. Although there is a understanding of research and its importance to paramedicine there is an need for further growth in paramedicine in the understanding of the role of research and the implementation of research results in meaningful evidence-based models in the paramedicine workplace and pre-workplace university environment.⁷⁷ This will require more integration, communication and understanding between the university sector and ambulance services to achieve the best results for our greatest resource our future paramedics.

Limitations of the review

- i) There were many publications that included multiple disciplines, inclusive of paramedicine; however, if there was not a discernible paramedicine voice, the study was excluded; consequently, it is possible that some findings were missed.
- ii) Contributing to the difficulty in finding studies were the varying definitions of paramedicine by different researchers. It is possible that studies were not discovered due to the broad spectrum of international terms used to define ambulance personnel.
- iii) Also contributing to the difficulty in finding studies was that many paramedicine journals are not indexed in the main international databases requiring a hand search of known paramedicine journals.

iv) Countries that did not have a national standardization requirement of an undergraduate degree in paramedicine were not included in the review (although some countries like Canada and the United States have the option in some regions), these countries were excluded due to the lack of a national standardization requirement.

Conclusions

The review has corroborated, clarified and reinforced knowledge about contemporary paramedicine learning. The twenty six studies and 305 illustrated findings have provided a rich source of evidence for understanding both facilitators and barriers to paramedicine learning in multiple contexts within three countries. The major implications of this review are that paramedicine learning must be brought to the forefront of the paramedicine profession both in the university sector and ambulance services. Better preparation and more robust models that take into account the identified barriers and facilitators to paramedicine learning need to be formulated, put into practice consistently reviewed and adaptive responses are needed to keep the paramedicine practitioner holistically prepared for the challenges of the role.

Recommendations for practice

This review recommends creating a supportive paramedicine learning environment with strategies to do this requiring both individual and organizational commitment. Recommendations are rated according the JBI Grades of Recommendation.⁷⁸

- i) National standardized curriculum that includes appropriate topics related to communication, paramedic emotional/mental health issues/support, working safely in the paramedic environment and includes a paramedic facilitator model, utilizing non traditional teaching methods that engage students and alternative placements/experiences in non-traditional settings that build on teamwork, communication, emotional resilience and leadership. (Grade A)
- ii) Creating a national standardized approach to the provision of professional support and development initiatives/programs for preceptors and sessional educators. (Grade A)
- iii) Provide time and consistency for paramedic preceptors with students both in university with sessional staff and during clinical placement, to allow for feedback and development. (Grade A)

Recommendations for research

- Due to the limitations of this review's inclusion criteria, future research utilizing a mixed methods

approach may yield a greater breadth and depth of findings.

- Review the evidence to develop a national standardized tool for provision of feedback and assessment for paramedicine students during clinical placements.
- Establish a standardization of the number of clinical placement hours required for paramedicine students during their undergraduate year for registration aligned with other allied health domains.
- Ongoing research is needed due to the continuing evolution of the paramedicine profession. Changes made to the curriculum must be based on a national model, be evidence-based and must be reviewed using an evidence-based approach\.

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Conflicts of interest

The authors declare no conflict of interest

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