Emergency Medical Services Core Competencies: A Scoping Review

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Emergency Medical Services Core Competencies: A Scoping Review

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Abstract

Introduction: the emergency medical services (EMS) are an important part of the health care system as they are the first point of contact for medical emergencies. Moreover, the EMS educational system has seen a rapid transition from a post-employment training model into a pre-employment educational model. Despite this, there is a lack of clarity on what core competencies EMS students are expected to hold.

Purpose: the objective of this scoping review was to identify the EMS student core competencies in the literature.

Method: the scoping review considered journal articles and grey literature (peer-reviewed and non-peer reviewed) and the following databases were utilized: CINAHL, MEDLINE, EMBASE, Scopus and ERIC. Grey literature was also searched using www.greylit.org, Google Scholar and Trove, and expert consultation and EMS professional associations were also considered.

Results: the search yielded 301 publications (CINAHL n = 53; MEDLINE n = 103; EMBASE n = 84; Scopus n = 6; ERIC n = 42; miscellaneous grey literature n = 13). After removal of duplicates, n = 241 citations remained. Abstract and title screening produced n = 35 publications, following which a full-text review was conducted. Consensus was reached on the inclusion of n = 25 publications for review. In total, n = 127 core competency statements were extracted which were then reviewed for clarity and removal of duplicates and clustered into a final list of n = 33 core competencies.

Discussion: the publications were discussed in a thematic approach. The review will provide insight into the scope of knowledge, abilities, skills and education that can be important to the conduct of paramedic students. Moreover, the review would be part of a greater project to develop a set of core competencies specifically designed for Bachelor EMS degrees in Saudi Arabia. This is the first scoping review that has attempted to systematically identify potential core competencies for paramedic students.

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Keywords: Attributes; Competence; EMS; Paramedic; Student

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1. Introduction

The field of emergency medical services (EMS) in many countries, including Saudi Arabia, has come a long way from the post-employment training model where the educational requirements of being a paramedic were minimal, such as completion of first aid certificates. This training was also only provided after employment. The new model for EMS education is a pre-employment model whereby the educational process is facilitated in university laboratories and classrooms, with the expectation that an EMS provider is trained prior to being employment, with the general pre-requisite for entering these courses being a high school qualification. The issue with such an elevation of educational standards, however, is that new EMS graduates have been reported to hold less than desirable core competencies, including a lack of maturity, poor skills in relation to communication, teamwork and empathy, deficiencies in clinical skills and shortcomings in overall work readiness for the paramedic role. Such deficiencies provide insight into the lack of direction in the ever-growing and expanding field of EMS, which is evolving and becoming part of a holistic health care model.

In a previous publication, an overview of the evolution of EMS in Saudi Arabia was undertaken. This review will be a next step in the process of identifying the desirable core competencies of paramedic students, by performing a scoping review to provide an international context of what has been deemed as important and desirable paramedic core competencies. For the purposes of this review, the World Health Organization (WHO) definition for core competencies will be utilized: “Identifies units of competency that an industry (health, education etc.) has agreed to be essential to be achieved by a person to provide quality services”. The objective of this scoping review is to identify the EMS student core competencies in the literature. Students in this context are accepted at any different level of training including pre-graduate and post-graduate. The term paramedic can be understood as EMT, critical care paramedic, community care paramedic or any other similar terms, but excludes other professions such as nurses, physicians and other health care providers. Moreover, no existing scoping reviews were revealed in the preliminary search, highlighting a gap in the current literature.

2. Methods and results

Arksey and O’Malley’s methodology suggests six stages for undertaking scoping reviews. The development of this scoping review was conducted to answer the following research question: “What are the desirable core competencies of paramedic students?”.

2.1. Identify relevant studies

The scoping review considered journal articles and grey literature (peer-reviewed and non-peer reviewed) and the following databases were utilized: CINAHL, MEDLINE, EMBASE, Scopus and ERIC. Grey
literature was also searched using www.greylit.org, Google Scholar and Trove, and expert consultation and EMS professional associations were also considered. The key search terms were based on the research question and applied to the concept of Population, Concept and Context (PCC), which are as follows: Population: Paramedic, Emergency Medical Services and Emergency Medical Technician, Concept: Competence and Attributes, Context: Student.

Based on the research question and PCC, the resulting Boolean search string was as follows:

(Paramedic OR "Emergency Medical Technician*" OR "Emergency Medical Service*") AND (Competence* OR Attribute*) AND Student*.

In addition to findings from the research literature, as an expansion to the grey literature element of the scoping review, core competencies from $n=5$ professional associations’ EMS guidelines were also incorporated.

### 2.2. Study selection

For literature to be selected for inclusion in the review, the primary step was to search the titles and abstracts of identified sources. This process produced $n=301$ publications (CINAHL $n=53$; MEDLINE $n=103$; EMBASE $n=84$; Scopus $n=6$ and ERIC $n=42$; miscellaneous grey literature $n=13$). Following removal of duplicates, $n=241$ citations remained and the literature was then independently reviewed by two authors (TA and BW) who reviewed the abstracts and titles to determine inclusion for the full-text review. The review yielded $n=35$ publications and the inclusion and exclusion criteria utilized were, articles involving EMS student core competencies, articles in English and/or Arabic and published between 2000 and 2016 and the study population were paramedic students enrolled in all types of educational and training programs.

Fig. 2.1. Flow diagram of scoping review results.
Source of PRISMA template.12.
Table 2.1
Research based journal articles and reviews.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of publication</th>
<th>Study location</th>
<th>Study type</th>
<th>Study population and cohorts</th>
<th>Study findings: core competencies</th>
</tr>
</thead>
</table>
| Alanazi et al.                 | 2012                | Saudi Arabia        | Modified Delphi       | Participants (n=20): paramedics (n=10); emergency consultants (n=10) | 1. Safety  
2. Communication  
3. Critical thinking  
4. Assessment  
5. Scene management  
6. Clinical skills  
7. Professionalism  
8. Team approach  
9. Teaching skills  
10. Research |
| Boyle et al.                  | 2011                | Australia           | Cross-sectional survey | Paramedic students (n=114)    | 1. Listening and communication  
2. Interpersonal relating  
3. Maturity, respect and tolerance  
4. Self-awareness in the team environment  
5. Belonging and professional identity |
| Ford et al.                   | 2014                | Australia           | Qualitative           | Paramedic students (n=29)     | 1. Information literacy  
2. Inter-professional communication |
| Hamilton et al.               | 2008                | Australia           | Review                | N/A                           | 1. Clinical skills  
2. Professionalism  
3. Personal qualities  
4. Knowledge base  
5. Clinical decision making  
6. Mentoring and clinical supervision  
7. Intellectual skills  
8. Communication skills  
9. Management  
10. Learning and professional development  
11. Assessment and history taking  
12. Driving  
13. Self-awareness  
14. Educational background  
15. Policy/ guidelines |
| Kilner et al.                 | 2014                | United Kingdom      | Delphi                | Paramedic professionalsFirst round (n=34); Second round (n=42) | 1. Clinical skills  
2. Professionalism  
3. Personal qualities  
4. Knowledge base  
5. Clinical decision making  
6. Mentoring and clinical supervision  
7. Intellectual skills  
8. Communication skills  
9. Management  
10. Learning and professional development  
11. Assessment and history taking  
12. Driving  
13. Self-awareness  
14. Educational background  
15. Policy/ guidelines |
16. Manual handling/health and safety
17. Fit for role
18. Equipment
19. Evidence base/research
20. Knowledge of common emergencies
21. Professional issues
22. Teaching/education skills
23. Course-based knowledge and skills
24. Range of experiences
25. Mental health skills

Mantha et al\textsuperscript{18} 2016 India Quantitative, pre- and post-training Paramedic students (n=40)

O’Brien et al\textsuperscript{19} 2013 Australia Qualitative Paramedic employers (n=11)

O’Brien et al\textsuperscript{10} 2013 Australia Mixed Paramedic students (n=23)

Riesen et al\textsuperscript{20} 2012 Canada Mixed, pre- and post-training Participants (n=60): paramedic students (n=14); other (n=46)

Ross et al\textsuperscript{21} 2014 Australia Quantitative Paramedic students (n=56)

Shields and Flin\textsuperscript{22} 2012 United Kingdom Review N/A

Spencer and Archer\textsuperscript{23} 2015 Australia Review N/A

Spencer and Archer\textsuperscript{24} 2008 Australia Review N/A

Tavares, Bowles and Donelon\textsuperscript{25} 2016 Canada Mixed method (review and qualitative interview) Participants (n=20)
Table 2.1 (continued)

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of publication</th>
<th>Study location</th>
<th>Study type</th>
<th>Study population and cohorts</th>
<th>Study findings: core competencies</th>
</tr>
</thead>
</table>
| Twinley                       | 2012                | United Kingdom | Quantitative     | Participants \((n=80)\); paramedic students \((n=28)\); occupational therapy students \((n=52)\) | 4. Educator  
5. Reflective practitioner (self-awareness, self-monitoring, and self-reflection)  
6. Professional (behaving ethically, morally, with integrity and respecting the individual while avoiding further harm) |
| Williams                      | 2013                | United Kingdom | Qualitative      | Paramedic students \((n=8)\)                                                                 | 1. Communication  
2. Emotional work                                                                                          |
| Williams, Onsman and Brown    | 2010                | Australia      | Delphi Pilot     | Paramedic experts \((n=63)\)                                                                | 1. Personal characteristics  
2. Clinical reasoning skills  
3. Interpersonal and team skills  
4. Professionalism  
5. Continuing professional development  
6. Social awareness  
7. Flexible learning  
8. Accountability  
9. Evidence-based practice  
10. Self-directed practice                                                                                     |
| Williams                      | 2011                | Australia      | Delphi           | Paramedic experts \((n=872)\)                                                               | 1. Personal behavior and attitudes  
2. Patient interaction and welfare  
3. Scientific approach to patient care  
4. Paramedic and society  
5. Commitment to professional and health care outcomes  
6. Professional behavior  
7. Interaction skills                                                                                         |
<p>| Włoszczak-Szubzda, Jarosz and Goniewicz | 2013    | Poland         | Mixed method     | Participants ((n=105)); paramedic ((n=31)); paramedic students ((n=74))              | 1. Communication                                                                                      |</p>
<table>
<thead>
<tr>
<th>Professional association</th>
<th>Country</th>
<th>Year</th>
<th>Domains (core competencies)</th>
</tr>
</thead>
</table>
| Health and Care Professions Council (1) | United Kingdom | 2014  | 1. Be able to practise safely and effectively within their scope of practice  
                                   |             |       | 2. Be able to practise within the legal and ethical boundaries of their profession  
                                   |             |       | 3. Be able to maintain fitness to practise  
                                   |             |       | 4. Be able to practise as an autonomous professional, exercising their own professional judgement  
                                   |             |       | 5. Be aware of the impact of culture, equality and diversity on practice  
                                   |             |       | 6. Be able to practise in a non-discriminatory manner  
                                   |             |       | 7. Understand the importance of, and be able to maintain, confidentiality  
                                   |             |       | 8. Be able to communicate effectively  
                                   |             |       | 9. Be able to work appropriately with others  
                                   |             |       | 10. Be able to maintain records appropriately  
                                   |             |       | 11. Be able to reflect on and review practice  
                                   |             |       | 12. Be able to assure the quality of their practice  
                                   |             |       | 13. Understand the key concepts of the knowledge base relevant to their profession  
                                   |             |       | 14. Be able to draw on appropriate knowledge and skills to inform practice  
                                   |             |       | 15. Understand the need to establish and maintain a safe practice environment  
| Health Professions Council of South Africa (2) | South Africa | 2014  | 1. Health care practitioner (clinical skills and professional attributes)  
                                   |             |       | 2. Communicator (patient-carer relationship)  
                                   |             |       | 3. Collaborator (work effectively within a team)  
                                   |             |       | 4. Leader and manager  
                                   |             |       | 5. Health advocate (advance the health and well-being of individuals and communities)  
                                   |             |       | 6. Scholar (commitment to reflective learning as well as the creation, dissemination, application and translation of knowledge)  
| Paramedic Association of Canada (3) | Canada       | 2011  | 1. Professional responsibilities  
                                   |             |       | 2. Communication  
                                   |             |       | 3. Health and safety  
                                   |             |       | 4. Assessment and diagnostics  
                                   |             |       | 5. Therapeutics  
                                   |             |       | 6. Integration (differential diagnosis skills, decision-making skills and psychomotor skills)  
                                   |             |       | 7. Transportation  
                                   |             |       | 8. Health promotion and public safety  
| Paramedics Australasia (4) | Australia     | 2011  | 1. Professional autonomy and accountability  
                                   |             |       | 2. Professional relationships (communication)  
                                   |             |       | 3. Evidence-based practice  
                                   |             |       | 4. Identification and assessment of health and social care needs  
                                   |             |       | 5. Teamwork |
Studies that did not address students but were targeted at clinical staff were excluded. The exclusion criteria also included all other health care providers who were not paramedics. Any publications that provided no statement related to the core competencies of paramedic students were also excluded. The full-text publications were then independently revised by two reviewers (TA and BW) and consensus was reached on the inclusion of $n = 23$ publications for the scoping review – see Fig. 2.1. The reference lists for the included full-text studies were also searched for relevant articles, which yielded another $n = 2$ publications. This brought the total number of included studies to $n = 25$.

2.3. Charting the data

The approach of charting all data according to a common descriptive analytical framework with general study information is part of the narrative tradition, and recommended by Arksey and O’Malley to fit the aims of the review. Furthermore, for the publications included, all terms related to the core competencies for paramedic students were collected under the study findings section (Tables 2.1 and 2.2).

2.4. Collating, summarizing and reporting results

The studies included in the review comprised quantitative ($n = 5$), qualitative ($n = 3$), review ($n = 4$), mixed method ($n = 4$) and Delphi method ($n = 4$). The distribution of studies and EMS professional association guidelines according to country were as follows: Australia $n = 13$; United Kingdom $n = 5$; Canada $n = 3$; India $n = 1$; Poland $n = 1$; Saudi Arabia $n = 1$; and South Africa $n = 1$. A total of $n = 20$ research-based journal articles were considered relevant to paramedic students’ core competencies which yielded a total of $n = 85$ identified core competency statements. In addition, EMS professional association guideline publications provided a total of $n = 42$ core competency statements. Pooling these two sets of competency statements together produced a total of $n = 127$ identified statements. For clarity and removal of duplicated competencies the statements were then reviewed and clustered, and a final list of $n = 33$ core competencies were identified (see Fig. 2.2).

According to Levac, Colquhoun and O’Brien, a scoping review should involve thematic analysis of a topic, where the product is associated with the purpose of the scoping review. This process has been considered in a thematic approach, involving the five prevalent core competencies extracted from the literature: communication; clinical skills; teamwork; critical thinking and decision making; and professional behavior.

2.5. Expert consultation

Two of the key expert authors in the field of EMS core competency were consulted on the current research and provided with a full list of the included articles. The contribution of Professor Björn-Ove Suserud generated...
three research articles that addressed ambulance nursing, although these did not meet the inclusion criteria. Dr Walter Tavares provided two research articles, one of which was included in the review while the other paper had already been found in the initial search process.

3. Discussion

The review found $n=25$ relevant publications from seven different countries, spanning a period of more than 14 years. The annual trends for research articles on this topic were limited; for example, only three studies
were published in 2000-2009. This increased considerably to 17 studies published between 2010 and 2016 which corresponds with the EMS professional associations guidelines that appeared in the period 2010-2014. The trends indicate a move towards professionalism and the need for competency standards and research within the field of EMS.

The rising trend of research explains the need for this review. By systematically searching and extracting the current international core competencies, the review provides EMS organizations and researchers with access to, and a basic map of, desirable core competencies for paramedic students. This scoping review forms a comprehensive list of core competencies for EMS students. The five prevalent themes of communication, clinical skills, teamwork, critical thinking and decision making and professional behavior which have emerged from this scoping review will now be discussed.

3.1. Communication

Communication is by far the most researched core competency for paramedic students. Communication not only featured in \( n = 19 \) of the \( n = 25 \) publications, but \( n = 5 \) articles were specifically designed to solely examine paramedic communication. Communication was mentioned in different forms and expressed through different constructs, such as interpersonal communication, professional communication, inter-professional communication, communication skills or divided into hearing and communication styles. The importance of communication in the field of EMS has been stressed by researchers, particularly in relation to effective listening, the ability to conduct inter-professional communication during patient handover and interpersonal skills in communication.\(^{14,16,21,26,30}\)

Research also suggests that competency in communication is a key component in providing high-quality care and gaining the respect and trust of patients during their hour of need.\(^{21}\) In circumstances where paramedics are working under pressure of time it is imperative they communicate appropriately with their patients and do not convey an impression of being in a hurry or avoiding communication.\(^{30}\)

In a Polish study that investigated paramedics’ competence in professional communication, it was found that paramedic students who were enrolled in communication courses were more competent communicators, in contrast to professional paramedics and other students.\(^{30}\) Wlośczań-Szubzda et al argue that the issue lies within paramedic educational programs in Poland where curricula content failed to address paramedics’ specific communication needs.\(^{30}\) Other research on hearing and communication reported that paramedic students’ listening style focused on the feelings and concerns of other people, with students adopting a friendly and attentive communication style that rendered them less prone to hostility in conversation.\(^{14}\) Boyle et al argue that such communication styles are appropriate for paramedic students and that persons inclined towards these styles may be drawn to become paramedics, a profession characterized by concern for others and interest in their wellbeing.\(^{14}\) The issue of communication in general, and inter-professional communication specifically, was addressed by Johnston, MacQuarrie and Rae through the use of inter-professional education exercises.\(^{16}\) The week-long exercise involved a total population of 200 students, of whom 130 were paramedic students and 70 were nursing students. Students from both disciplines were involved in the handover and management of different scenarios involving trauma and different age groups.\(^{16}\) This approach was reported to have had a positive effect on students’ competence and improved their confidence and effectiveness in clinical handover and communication. The importance of embedding communication as a core competency in EMS education is recommended by several authors, although there needs to be further work in this area particularly on examination of measures of communication as a core competency.\(^{26,30}\)

3.2. Clinical skills

Clinical skills are the second theme in the review and featured in \( n = 10 \) publications. While the definition of clinical skills may differ between publications, it is generally considered to be a variety of clinical skills used to manage a range of common emergency conditions. The clinical skills core competency is generally considered essential for a paramedic student to excel in performing.\(^{2,13,17,19,25}\) Examples of clinical skills include defibrillation, drug administration and airway management.\(^{17}\) The earliest research found by this review was Kilner’s 2004 UK study in which the aim was to identify desirable paramedic attributes using the Delphi expert technique.\(^{17}\) Clinical skills scored highest for collected competency statements and also recorded a high mean score, alongside other core competencies which had similar or higher means, such as self-awareness, evidence-based practice mentoring and supervision.\(^{17}\) While clinical skills were considered to feature prominently in educational curricula, other core competencies were not present.\(^{17}\) Bowden and
Masters have linked this with the lack of an underlying capacities model, where level two and three capacities do not feature prominently in vocational training.\textsuperscript{37} In contrast, the new generation of university paramedic students are reported to have concerns with clinical practice; however, the evidence is that when students are transitioned into an internship phase to link theory with practice, their clinical practice improved.\textsuperscript{2,19} The strength of university educated paramedics lies in the flexibility of new graduates who are considered to have appropriate clinical skills, excellent theoretical knowledge and employability competencies, including problem solving and critical thinking.\textsuperscript{2} Therefore, embedding the clinical skills core competency with other important core competencies in university programs, provides a framework for an educational system that produces competent, well-rounded, patient-centered paramedics.

### 3.3. Teamwork

Teamwork emerged as the third theme from the review and featured in \( n = 9 \) publications. Teamwork is regarded as an important core competency for paramedics, since the field of EMS involves working as part of an interdisciplinary team and is associated with handing over patients to physicians and nurses in an emergency department or working with fire fighters, police and other paramedics on-scene.\textsuperscript{6,16,22,25} Mantha et al. report the findings of a study that investigated the development of the first non-technical skills curriculum in India where a training course was developed to address concerns about crowd control and safety risks for the patient and EMS professional. Differences in culture, religion, language and public awareness of the EMS profession were all cited as reasons for on-scene resistance towards paramedics.\textsuperscript{18} The training course was found to have improved non-technical skills core competencies in 58–80\% of the participants \( n = 37 \), providing evidence of the importance of including non-technical skills, including teamwork training, in EMS educational curricula.\textsuperscript{18} The teamwork core competency was also addressed by Ford et al who stressed deficiencies in the relational competence of fresh EMS graduates when applied to their work roles.\textsuperscript{6} In an effort to address the issue, a simulated and challenging wilderness exercise involving 29 senior paramedic students was conducted over three days. The students kept field diaries and were invited to focus groups after the exercise.\textsuperscript{6} The exercise was reported to have contributed to an improved level of understanding about communication strategies, with benefits for team cohesion and the transitioning of graduates into the workforce.\textsuperscript{6}

The current literature highlights the elevation of the teamwork core competency either through exercise simulations or short courses.\textsuperscript{5,16,18} There are concerns, however, regarding the paucity of research into the integration of the teamwork competency in university curricula. While simulated exercises and training courses are recognized as important, they are only a stop-gap process for remedying the issue before or after graduation and are not part of academic university or college programs.\textsuperscript{6,16,18} The focus should be on pre-hospital EMS research that addresses the concerns of teamwork in the EMS profession.

### 3.4. Critical thinking and decision making

The fourth theme of critical thinking and decision making is thought to be especially relevant to the EMS discipline and featured in \( n = 8 \) publications.\textsuperscript{2} Interviews with \( n = 11 \) senior educational and operational EMS personnel who worked for Australian ambulance services that employed Bachelor degree graduates, highlighted the importance of critical thinking for paramedics. The everyday duties of paramedics can be very different to those of other health professionals and they are often presented with cases that the individual has not dealt with before.\textsuperscript{2}

The process of decision making during clinical care is very important and this can be evident during emergency calls where paramedics are expected to make many on-scene decisions on the best way to deal with a medical situation. These types of decisions include whether or not to provide patient care en route to hospital or to offer on-scene patient care.\textsuperscript{22} This may be why in certain studies such as Kilner’s, the term is called ‘clinical decision making’ and is defined as the mental and cognitive skills associated with the ability to understand clinical data, the process of applying clinical judgement and decision making and, finally, formulating a clinical diagnosis.\textsuperscript{17} Kilner’s definition is specific to the clinical aspects of the EMS profession, whereas Shields and Flin adopt a broader definition where judgement and course of action specific to any situation defines decision making.\textsuperscript{17,22} The outlook on the decision making core competency can be understood in the context of the Bowden and Master’s model which stresses the importance of the links between the
different levels and not simply the representation of one level.\textsuperscript{37} In contrast, Kilner focused on the first level of observable practice which is similar to the outlook of the vocational training sector. Shields and Flin, however, adopted a broader approach that was influenced by other more established professions but also includes the underlying levels of the Bowden and Master’s model.\textsuperscript{22,37}

3.5. Professional behavior

Professional behavior is the fifth and last theme in this review and featured in $n=7$ publications. The term ‘professional behaviour’ is a broad core competency that encompasses many concepts.\textsuperscript{6,17,25} For example, Tavares, Bowles and Donelon describe many aspects that may be associated with professional behavior such as empathy, compassion, ethics and morality of the health provider, care, honesty and a continued commitment to excellence.\textsuperscript{25} One of these, honesty, was the highest ranked desirable attribute by all participants in Kilner’s study and was recommended as an essential quality to be considered when recruiting EMS professionals.\textsuperscript{17} In Ford et al’s research, which involved a simulated wilderness exercise, the participants regarded their professional teams very favourably.\textsuperscript{6} The stated reasons for this were the benefits gained from individuals’ diverse set of skills, the experience of belonging to the team which contributed to the learning experience and the satisfaction of being recognized for contributions made to the team.\textsuperscript{6} These positive outcomes gave individuals a sense of belonging to their professional group and pride in their professional identity which is associated with personal accountability for practice and responsibility for the wellbeing of colleagues within the profession.\textsuperscript{6} This suggests that professional behavior is imperative for EMS students to ensure their successful pathway into the profession and for appropriate standards of performance once they have joined the workforce.

This review has demonstrated that many core competencies overlap, such as the importance of communication in teamwork. Moreover, when paramedics are on-scene these core competencies are practiced simultaneously; to quote one of the paramedic student participants in the study by Ford et al: “I think I learnt more about communication, teamwork and leadership than I did about my clinical skills. It became obvious... that leadership is very important and communication/teamwork is vital to good care. I felt that... you don’t understand how important it is until you are in that situation.”\textsuperscript{30}

4. Limitations

The review identified a considerable number of core competencies for paramedics which the authors amended to create a total number of core competencies without overlapping and redundant items. This process may therefore have removed some subtle differences and nuances between overlapping core competencies and while considerable care was taken when amending the list, ultimately, this process is to a certain degree open to interpretation. Moreover, any studies that were written in other languages such as French, German and Swedish were not included, which may have limited the number of relevant studies and information. Finally, Professors. Brett Williams, who is a co-author in this review has a long repertoire of publications in EMS, especially paramedic competency, therefore some of his authored and co-authored research has been included in this review, as per research protocols.

5. Future directions

It is important that future research builds on the findings from this scoping review and the authors’ previous study.\textsuperscript{1} This scoping review discovered a modest amount of research concerning EMS student core competencies which can be used as a starting evidence base for further research on EMS core competencies in Saudi Arabia and other countries. In the Saudi Arabian context, development of the core competencies model should involve a combination of international standards and local Saudi requirements. The research aims of the current study have been met with the extraction of $n=33$ international core competency statements from the scoping review and $n=7$ core competency statements from the review of Saudi universities and colleges. The next step in this process is to combine international and national core competencies and subject them to Delphi research, followed by a national study involving Saudi Arabian EMS. Finally, the development of a systematic review based on this scoping review, may be a future step to assess the quality of the research in the field.

6. Conclusion

This is the first scoping review to systematically identify the potential core competencies for paramedic students. Moreover, this review has provided an insight into the scope of knowledge, abilities, skills and education that can be important to the conduct of paramedic students. The other important aspect of the
review is that the findings contribute to a greater project to develop a set of core competencies specifically designed for Bachelor EMS degrees in Saudi Arabia. This review and future projects lay the evidence-based groundwork for establishing EMS competencies in Saudi Arabia, the Arabian Gulf states and other countries.

Disclosure

The authors declare that they have no competing interests.

References


