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ORIGINAL ARTICLE

Emergency medical services in rural and urban Saudi Arabia: A qualitative study of Red Crescent emergency personnel' perceptions of workforce and patient factors impacting effective delivery

Ahmed Ramdan M. Alanazy PhD[1,2,3] | John Fraser MD[1] | Stuart Wark PhD[1]

[1]Faculty of Medicine and Health, School of Rural Medicine, University of New England, Armidale, New South Wales, Australia

[2]Emergency Medical Services, College of Applied Medical Sciences, King Saud Bin Abdulaziz University for Health Sciences, Al Ahsaa, Saudi Arabia

[3]King Abdullah International Medical Research Center, Al Ahsaa, Saudi Arabia

Correspondence
Stuart Wark, Faculty of Medicine and Health, School of Rural Medicine, University of New England, Armidale, NSW, Australia.
Email: swark5@une.edu.au

Abstract

Individuals who experience a traumatic injury or an acute illness are often reliant on initial healthcare assessment and support from a pre-hospital emergency medical service (EMS). These community-based support models perform a vital role in the provision of life-saving support, but research indicates that the availability, accessibility and resources of EMS are not equivalent in rural and urban areas, and there has been little recognition of the issues facing rural EMS provision outside of the USA, Europe and Australia. The purpose of the current study was to examine the lived experiences of Saudi Arabian EMS personnel, defined as emergency medical technicians, paramedics and local station managers. A semi-structured interview approach was used to collect data from 20 interviewees (10 each with rural and urban personnel) in the Riyadh region of the Kingdom of Saudi Arabia. This methodology was used to identify the key issues that these staff face in their day-to-day work practice and ascertain factors that may lead to service delivery issues in rural and urban areas. Data analyses identified three thematic categories impacting EMS delivery; two of these, Personnel Factors and Patient Factors, are the focus of this paper. The participants noted a number of key issues, including a lack of appropriate local training and limited resources in rural areas, as well as general areas of concern regarding the wider EMS staff demographic makeup and poor public awareness about the exact role of the EMS. Three key recommendations arising from this study include specialised training and ongoing accessible education for rural EMS staff to allow for better support for patients; consideration of supplementing the current EMS with additional external specialist staff; and the development and implementation of national public education programmes focusing on the role of the EMS within the community.

KEYWORDS

critical care, emergency medical services (EMS), rural, Saudi Arabia, urban, workforce

1 | INTRODUCTION

In the event of a serious accident or episode of acute illness in either their home or a wider general community location, individuals will often be reliant on initial healthcare assessment and support from a pre-hospital emergency medical service (EMS). It has been well established for many years that these community-based support models perform a vital role in the provision of life-saving support for patients suffering traumatic injuries or other serious medical conditions (e.g. Moore, 1999). However, studies in countries such as the USA and Australia indicate that the availability, accessibility and resources of EMS are not equivalent in rural and urban areas, and these differences can impact on the patient short- and long-term health outcomes (Choo et al., 2011; Fatovich et al., 2011; Smith, 2017). The larger population bases that are concentrated in urban centres are not surprisingly linked to greater access and availability of pre-hospital EMS options when compared to lower populated rural areas (Alanazy et al., 2019). Furthermore, potentially poor road networks in rural regions can also result in additional transportation factors not experienced in urban locations, including both time and ongoing running costs associated with the need for heavier-duty vehicles, and also heightened risk of breakdown when reaching patient location (Alanazy et al., 2019; Fatovich et al., 2011).

Socio-economic and demographic factors of rural residents also account for some of the noted disparities in access and quality of EMS (Chng et al., 2001). For example, people living in rural locations have a higher risk of traumatic deaths when compared to urban settings and lower survival rates following out-of-hospital cardiac arrest (Fatovich et al., 2011; Jennings et al., 2006; Mathiesen et al., 2018; Nordberg et al., 2015; Park et al., 2018). In particular, prior research has noted that longer ambulance response times are linked to this observed reduction in survival rates in rural areas (Gonzalez et al., 2006). Underpinning all of these geographic discrepancies is a major workforce issue, with a noted preference of many EMS staff to work in urban centres as compared to rural areas (AlShammari et al., 2017). The opportunities for career development were identified as a key factor in EMS professionals noting the desire for an urban rather than rural assignment (Chng et al., 2001).

While the majority of research has focused on countries such as the UK, USA and Australia (Alanazy et al., 2019), disparities in the provision of EMS in rural and urban locations have been specifically reported in Saudi Arabia (Alanazy et al., 2020a). The purpose of this study is to build upon this previous research to specifically examine the lived experience and direct insights of current EMS personnel in Saudi Arabia. The focus of this paper is on identifying the key issues that EMS staff face in their day-to-day work practice, noting both similarities and differences between rural and urban areas. This information may then assist to formulate potential recommendations to improve the provision of community-based EMS across both rural and urban areas of Saudi Arabia.

What is known about this topic?

- Individuals requiring urgent medical assistance are often supported by pre-hospital emergency medical services (EMS).
- The availability, accessibility and resources of EMS are not the same in rural and urban areas, which causes both short- and long-term health disparities
- There has been little focus on issues associated with rural EMS provision outside of the USA, Europe and Australia.

What this paper adds?

- Saudi EMS staff face issues in their day-to-day work including a lack of local training and resources in rural areas, along with workforce makeup and public awareness issues
- Identified problems could potentially be addressed through using female registered nurses and additional specialised training
- National public education programmes could help address misconceptions about the role of Saudi EMS.

2 | METHODS

This study is a part of a larger project looking at the provision of EMS within the Kingdom of Saudi Arabia, and specifically considering commonalities and disparities in EMS delivery between rural and urban areas (Alanazy et al., 2020a, 2020b; Alanazy, Wark, et al., 2021). Ethical approval for this research was granted by the University of New England's Human Research Ethics Committee, the Saudi Arabia Ministry of Health Ethical Committee, the King Abdulaziz Medical City Ethical Committee and the Saudi Red Crescent Authority. With individual consent obtained from all participants prior to commencement.

2.1 | Study design

In order to better understand the factors that cause problems for EMS delivery in rural and urban locations in Saudi Arabia, this project adopted a hermeneutic phenomenology research methodology. Hermeneutic phenomenology was chosen the preferred research design approach; this methodology was considered integral to effectively capturing the lived experience of frontline providers of EMS, and then for undertaking the reflective analyses of their subjective experiences (Noblit & Hare, 1988; Polit & Beck, 2020). The decision to use a hermeneutic phenomenology methodology was based on the goal of seeking data that identifies the specific concerns and challenges facing frontline workers involved in providing emergency medical care. Within this approach, those employees at the

'coalface'––emergency medical technician (EMT)s, paramedics and local station managers within the EMS system––were deemed the most appropriate to gain insights into the provision of pre-hospital medical services. The use of semi-structured individual interview was adopted as the critical component in the collection of data from both rural and urban participants.

2.2 | Materials

The project utilised semi-structured in-depth interviews with both rural and urban EMS personnel residing in the Riyadh region in the Kingdom of Saudi Arabia. Further details on the participants are included below. An interview template was developed by the research team prior to the commencement of the study. These questions in the initial interview template were directly informed by quantitative data gained in previous stages of the larger project (Alanazy et al., 2020a, 2020b; Alanazy, Wark, et al., 2021). In order to add rigour to the process (LoBiondo-Wood & Haber, 2002; Silverman, 2019), this initial interview template was piloted with two participants who were then not included in the final study. The actual content of these interviews was not formally analysed; instead feedback from the participants was sought following each interview regarding what questions were deemed either not appropriate or did not encourage the detailing of relevant experiences, whether there were any specific improvements that could be made to the wording of the questions to enhance clarity, and also any other general concerns or observations. This information was considered by the research team, and minor modifications made to develop the final version of the interview template.

2.3 | Study setting

The study was undertaken in the Riyadh region of the Kingdom of Saudi Arabia, and purposively recruited participants to represent both rural and urban areas. Riyadh region has an estimated population of 8 million people, including the capital city of Saudi Arabia, which is also called Riyadh. It is one of the 13 administrative regions across the Kingdom.

2.4 | Participants

Saudi Red Crescent is the primary community-based EMS service in Saudi Arabia, with separate EMS servicing the military and some industrial sites (AlShammari et al., 2017; Alshamrani et al., 2020). Potential participants in the current study were defined prior to commencement as being currently employed by Saudi Red Crescent as either an EMT, paramedic or an EMS station manager, and who had at least 5 years experience as an EMS staff member.

Participants who had completed previous components of the larger study were asked to indicate their willingness to undertake a subsequent interview. Expressions of interest were sought from the pool of individuals who had consented to the follow-up interview and who met the eligibility criteria. Interviews were then scheduled on the basis of first-respondents, with an initial schedule agreed with 10 participants from both rural and urban locations. Interviews were planned to be undertaken until data saturation was reached, with additional interviews to be organised once the first round of 20 had occurred. However, for both the rural and urban samples, iterative analysis of the transcripts by the researchers indicated that data saturation had been reached prior to the tenth interview for each location. Nonetheless, the remaining arranged interviews were still undertaken to ensure that all volunteers felt their input was valued, and their data were included in the final analyses.

2.5 | Data collection procedure

Interviews were conducted between October 2019 and July 2020 in two separate stages. The first component was a face-to-face interview with each separate participant at their respective EMS centre in Riyadh region. The second stage followed initial data analyses and involved the use of an on-line technology [Zoom] to undertake a follow-up interview to clarify any points that were not clear from the initial interview. These interviews were not face-to-face and were conducted via Zoom due to Covid-19 restrictions, but to enhance the consistency of approach, both the face-to-face and Zoom interviews were audio-recorded on the same device. While all of the interviews were conducted in Arabic and then translated and transcribed into English, many participants were fluent in both Arabic and English. The English transcripts were therefore shared with the bi-lingual participants for validation and trustworthiness of both the translation and transcription. For non-English speakers, the Arabic transcripts were shared with the participants for confirmation of content, and a certified translation was then used for the validation of these transcripts.

2.6 | Analysis

A thematic analysis methodological approach (St John, 2004) was chosen to analyse the interview data, using the framework of Braun and Clarke (2006). An anonymous identifier was allocated to each individual prior to commencing the analysis, along with noting their location (rural or urban) and total years of experience. The first stage of the analysis had each member of the research team read the transcripts as they occurred in order to gain a general feeling of key themes, and to determine when data saturation was reached. A group meeting then established an initial coding structure based on preliminary thematic areas. The researchers then individually coded each of the English translations of the transcripts, and included a commentary on the context for each participant.

The second stage of the analysis involved two members of the research team discussing the emerging themes and sub-themes, and

determining a final coding structure. The interviews were jointly analysed in line with the coding structure and collaboratively refined into thematic areas. Another member of the research team not involved in the coding was nominated to act as an arbiter in the event of any disagreements about thematic areas that could not be resolved through discussion, but this was not ultimately required.

3 | FINDINGS

The final sample included 20 male participants, and was composed of 10 from rural and 10 from urban locations. The mean age of the rural participants was 35.25, and they had a mean 11.5 years of experience. The mean age of urban participants was very similar at 32.5, however they reported an average of around 1.5 years less experience (mean = 9.9). With respect to the participant job roles, there were seven managers (four rural and three urban), three paramedics (0 rural and three urban) and 10 EMTs (six rural and four urban).

The analysis of the interview transcripts identified three key themes which assist in understanding EMS provision across rural and urban areas, and also give insight into how issues in service delivery may be overcome. The three key themes were EMS Personnel Issues; Patient Factors; and Organisational Factors. While it was originally planned to present the findings of all three themes within one manuscript, this was not feasible due to journal word limits, as the richness of the qualitative data could not be effectively explored within these constraints. Therefore, the focus of this paper is on the two themes of EMS Personnel Issues and Patient Factors, with the third theme of Organisational Factors being subject of a separate publication (Alanazy, Fraser, & Wark, 2021).

Further analysis of the two themes of EMS Personnel Issues and Patient Factors identified a number of sub-themes including Training and education; Sex imbalance; Expectations of care; Culture; and Violence, amongst others. Table 1 outlines all three themes and sub-themes arising from this study.

The results are outlined sequentially below for the two themes. Illustrative quotes are included, with the participants' location and years of experience also noted to provide additional context for the reader.

TABLE 1 The three themes and their respective sub-themes

Theme	Sub-Themes
EMS Personnel Issues	Caring role Work conditions Work stress Training and education Sex imbalance Culture
Patient Factors	Expectations of care Awareness of service Culture Location of patients Violence
Organisational Factors[a]	Reason for call-out Response time Transportation time Coordination Resourcing

[a]Reported separately (see Alanazy, Fraser, & Wark, 2021).

3.1 | EMS personnel issues

Participants reported a general perception that EMS staff wanted to work in an urban rather than rural area, although some noted that their own personal preference was different. Discussion as to the reasons for this belief indicated that one of the primary factors was a perceived lack of training opportunities in rural areas. Participants indicated a need for ongoing training and quality improvement of job skills through progressive ongoing education, but that these opportunities were not readily available in rural settings. It was proposed that there should be greatly equality in access to this vital training, and that it should occur specifically in rural areas and not be provided solely in urban centres that necessitate rural staff to have an overnight stay. One EMT (rural, 9 years experience) said: 'We need the courses to be made available in our area because at the moment we need to travel to the city to get those courses'.

Another example of unmet training needs in rural areas related to patients with specific emergency medical conditions that require more advanced medical support. This advanced training is not readily available outside of urban centres, and the importance of the problem was highlighted with the further finding that rural EMS personnel were perceived to actually require higher levels of basic and advanced education and training than urban staff. For example, one manager (rural, 11 years experience) said: 'I think we need more well trained paramedics in the rural area so that the scope of the practice will be more than the normal paramedic'. He went on to note that "If we have more qualified intensive paramedics in both rural and urban areas, the patients' outcomes will significantly improve'.

The inability to perform routine tests such as x-rays and blood tests was also noted as a concern for rural areas. While patients in urban areas could be readily supported by other medical professionals, this was not always the case in more remote rural locations. EMS staff can only provide basic medical services, such as assessment of vital signs. One manager (urban, 16 years of experience) said:

> One of the differences is that the type of the cases differ in urban from those in rural. Most of the urban cases are medical while most of the rural cases are trauma. Also, the type of the services differ in rural from those in urban because the rural EMS do not face plenty of cases like the urban so they might have the lack of experiences to deal with cases in the rural area. In addition, the EMS workers in the rural area are EMTs while we have specialist doctors and EMTs in urban area.

A sector-wide sex imbalance in the workforce was identified as another impediment for EMS personnel and considered to impact on EMS capacity to provide appropriate care for female patients. Examples were suggested where support from female EMS staff would be particularly beneficial, such as for female-focused medical procedures including obstetric emergencies. One paramedic (urban, 7 years experience) said: 'In my opinion, nowadays female EMS staffs are necessary in some cases such as some OB/GYN patients'. However, the fact that this sex imbalance was nation-wide meant that it was not possible to discern any real difference between urban and rural areas in this regard.

3.2 | Patient factors

Participants from both urban and rural areas indicated that they were obliged to comply with patient' wishes in providing on-scene emergency medical attention. Some EMS participants reported that they lacked the authority to deny the patient transportation to hospital if the patient asked for it, even if the EMS staff' on-scene assessment deemed that it was not an emergency and transportation was not necessary. An example was provided where a patient had called the EMS to take them to hospital simply for a routine check-up of their vital signs. A paramedic (urban, 8 years experience) commented on this issue by saying:

> Sometimes we can't refuse to transport the patient if he requests to be transported due to many reasons. There is a limited authority given to the paramedics, the fear of violence by the paramedics from the patient and his relatives and finally the lack of public awareness on this subject.

The perception of whether an EMS employee had the authority to make on-scene decisions varied, but it is worth noting that there was no difference evident between urban and rural locations. Participants in both locations reported that they never refused to transport a patient, even if they assessed the situation as not being a medical emergency, as they were concerned by the potential violent reaction by the patients and their relatives. Furthermore, to that perception of physical threat, one paramedic (urban, 5 years experience) stated that they would simply comply with patient' wishes in order to avert any subsequent cases of legal action against them: 'To protect ourselves from any legal action, it is good to transfer the patient if the patient requests'.

There were some reported differences between rural and urban patients' expectations of the EMS, with choice of destination the main example. A paramedic (6 years experience) based in an urban location reported that the greater number of healthcare options meant that some patients chose not to be transported to the nearest location as they had a specific hospital preference that was further away. He commented that: 'Some patients refuse being transported to the nearest hospital by the ambulance just because they want a specific hospital which may be so far from their location'. This was not reported in rural locations, where there was normally only one possible choice of healthcare provider.

Participants noted that some patients expressed a strong personal preference for female EMS support. While a lack of female staff may limit the ability of the EMS to provide non-specialist obstetric or gynaecological emergency services and support on-scene, it was identified that there was an unwillingness of some female patients to be generally treated or even transported by a male EMS staff member. There was not perceived to be a difference between rural and urban locations for this issue. An urban manager (15 years experience) noted that: '… sometimes female patients request female nurse or female paramedic so they can get the treatment directly from them'. A rural EMT (7 years experience) noted that they transported less female than male patients, and when asked the reason for this difference, he explained that: 'This is because most of the calls from female patients we receive asked for female paramedics and we do not have one at the moment'. Another EMT (rural, 7 years experience) also identified this problem, noting that: 'including female paramedics will help increase the number of female patients transported'. However, it is worth recognising that this general view was not shared by all EMS staff that were interviewed. One rural EMT (9 years experience) said: '…we rarely encounter female patients refusing transport because we are male'.

The prevailing culture of Saudi Arabia was noted as potentially inhibiting the future inclusion of more female paramedics, with an urban paramedic (10 years experience) noting that 'I think in our community they don't trust female paramedic to treat them'. One EMT (rural, 8 years experience) commented that:

> I think the culture plays a role because I encountered some cases when I used to work in the urban station. When we reached the scene, the female patient refused to be treated and transported by us.

A possible solution was suggested by an urban EMT (5 years experience) who proposed that:

> I think if we should have more cooperation with the hospital so that when a caller requests for a female paramedic, we can take the female nurse from the nearest hospital with us to help us deal with the case.

4 | DISCUSSION

The purpose of this study was to examine the lived experiences of EMS personnel in Saudi Arabia, and to identify key issues that staff face in their day-to-day work practice with specific consideration of any similarities and differences between rural and urban participants. As noted in the Findings, all of the participants in this study were male, but this is reflective of the demographics of EMS personnel in Saudi Arabia (Alharthy et al., 2018).

The thematic analysis of responses indicated that there were a number of factors that may assist in explaining issues relating to access of EMS in rural and urban regions. Three thematic areas were identified, with the focus of this paper on the two themes of EMS Personnel Issues and Patient Factors. It is worth noting that within each theme there was significant overlap in the issues between geographic locations, and the findings indicate that urban EMS in Saudi Arabia regularly face similar problems similar to their rural counterparts. The following discussion section focuses on some of the key problem areas that were identified and suggests possible solutions that could be easily implemented and do not require substantial financial or infrastructure changes.

There were a number of issues raised in relation to EMS personnel, some of which were specific to rural areas and some were generic across all locations. It has been previously identified in other locations that EMS staff generally prefer to work within urban areas (Freeman et al., 2009). In the current study, identified problems that may explain this preference for urban areas included a skills gap associated with training and education for rural EMS staff. Any skill deficiencies or limitations in the on-scene personnel in providing EMS will naturally have a significant impact on the outcomes for the EMS. It has been identified for many years that the training of rural EMS staff with regard to use of technology, and in performing comprehensive patient condition assessment before transportation to health facility for further treatment, is comparatively lower when compared to urban peers (Kobusingye et al., 2006). This failure may expose patients to a greater risk of death and/or ongoing health morbidities as appropriate assessment of need, and capacity to provide necessary care, is not able to be provided at the same level.

Equipping EMS personnel with the skills for intensive emergency critical and advanced supportive technology tools is key in the delivery of better EMS (Pandit et al., 2019), and is particularly pertinent in rural areas of Saudi Arabia where there is a reported higher rate of traumatic emergencies (Alanazy et al., 2020a). As part of any expanded scope, training could facilitate individual performance of additional roles in on-scene health service delivery context. This could be achieved by training EMS staff in the effective use of triage systems to help in minimising the on-scene categorisation of patients as immediate priorities or those who can be delayed due to less urgent conditions (Hanfling et al., 2012). Greater use of online 'e-health' and distance training modules may also assist in increasing some EMS skillsets, although it is acknowledged that there are technological barriers in terms of connectivity and software in Saudi Arabia (McCoy et al., 2019) and that this approach is not necessarily applicable for all 'hands-on' teaching modalities.

It is known that the pre-hospital EMS system in Saudi Arabia is dominated by male staff, with few female EMTs or paramedics (Alharthy et al., 2018). This lack of female EMTs and paramedics with the Saudi Red Crescent EMS was identified as being a significant impediment in the effective delivery of health services in both rural and urban areas. It was recognised that some patients preferred being attended to by a health professional of similar sex, and this is relevant in culturally sensitive populations (Pitchforth et al., 2006). The specific inclusion of female EMS personnel is considered likely to have a positive impact in addressing certain sex-specific treatment processes, such as supporting individuals with an emergency obstetrics issue (Attum et al., 2018) as well as general access by female patients. While the lack of female EMTs and paramedics is consistent across both rural and urban areas, within rural locations there may be other cultural and social considerations for the provision of EMS, and this in turn impacts on the quality and efficiency of the support being provided to patients (Abu-Grain et al., 2018). One participant stated that they could not remember any occasion in which a female patient refused transport due to the sex of the on-scene EMS staff, however this does not preclude the fact that female patients may not even contact the EMS in the first place if they believe they will be treated by a male.

Attempting to redress the current sex imbalance within the Saudi Arabian EMS will take many years, and will require a multi-pronged approach in areas including general and specific advocacy, improved educational access and widespread public awareness campaigns. While this is happening, viable short-term solutions need to be evaluated and implemented to address the existing problem. Therefore, as suggested by one participant, supplementing the existing EMS staff with female registered nurses is recommended as a possible option. There have been some attempts elsewhere in the world to better use the wider healthcare workforce for managing medical emergencies (e.g. Eastwood et al., 2015; Höglund et al., 2019). As Saudi Arabia does have an existing base of female nurses (Elmorshedy et al., 2020), utilising staff who have a complementary skillset to support EMS delivery may be worthwhile exploring. It is acknowledged that this may not be as feasible in rural areas, where hospitals may also experience a shortage of female nurses.

Patient' choices accounted for some of the observed variations in delivery of EMS in rural and urban regions. Urban patient' expectations, such as the preference to be taken to a particular medical facility, could either result in a patient' decision to simply not be transported or a longer transportation period, both of which can negatively affect survival and recovery outcomes (Alanazy et al., 2019). The patient's choice consequently constitutes a key factor in the identification of ways of improving efficiency in functioning and optimisation of medical team's outcomes (Newgard et al., 2013), with factors such as closest centre, specialty services and ambulatory diversion affecting outcomes. The reports of threats of violence or litigation from the patient or their relatives when EMS staff refuse to either treat or transport a patient is concerning. This issue perhaps highlights that some of the population lacks sufficient understanding or appreciation for the role of EMS staff. Better public education may assist to address these problems, with advertising or promotional programmes a possible way to enhance knowledge of when to call EMS and what the EMS personnel can and cannot do once on scene. Clarification of whether, and in what situations, EMS staff are able to refuse a patient transportation would also be highly beneficial in both urban and rural locations.

4.1 | Limitations

This paper reports on research undertaken in the region of Riyadh in Saudi Arabia. This location was deliberately chosen as being generally likely to be representative of the wider Kingdom, but it is recognised that the reported experiences may differ vastly for EMS personnel residing in other locations. Care should therefore be taken in comparing these findings to other regions and countries, with specific consideration of differences in how EMS health services are legislated and regulated in those locations.

4.2 | Recommendations

The participants identified issues associated with the geographical locations of patients and EMS outcomes, as well as general areas of concern for EMS delivery. There are three key recommendations suggested that could be easily implemented with minimal cost or resource implications, and these are noted below:

- The lack of female EMS staff was identified as a significant issue. The specific inclusion of female paramedics across all locations is likely to better meet the needs of female patients, and will help in the enhancement of cultural competence of EMS teams. However, as this is not feasible due to the current shortage of female paramedics, it is suggested that supplementing EMS with female registered nurses to travel with and support the existing EMT and paramedics may assist to address this issue in the short-term. This should occur simultaneously with a renewed emphasis at the national level on training and recruitment of female paramedics, and may include specific incentives for females to enter the profession.
- There is a need to reduce the knowledge and practice gaps evident in education and training of staff between urban and rural locations. Rural EMS staff need specialised training and ongoing accessible education to allow for better support for patients. This change will be crucial in enabling delivery of advanced on-scene procedures which are key in reducing the severity of patient's injury. Consideration of alternative content delivery modalities, such as e-health training modules, may be feasible in addressing some gaps in knowledge.
- A national public education programme, focusing on the role of the EMS and what staff can and cannot do, would be worthwhile in addressing some of the perceived misunderstandings regarding inappropriate calls for EMS by the general public and threats to staff.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on reasonable request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Stuart Wark https://orcid.org/0000-0002-5366-1860

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