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The awkward teenager: paramedicine's unbalanced development as a profession – an educational theory perspective

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Introduction

Now that the question of whether or not paramedicine wants to be a profession has been answered, the next steps must focus on ensuring that paramedicine fulfils the required criteria to develop into a fully-fledged profession, not just in name, but also in practice. Utilising a taxonomic approach to characteristics of a discipline the question was asked: Does paramedicine fulfil the required criteria of that of a true profession?

Methods

An extensive literature review into the educational development of comparative health related professions was constructed. This review included the identification of underpinning educational theory and its contextual application in contemporary clinical curricula. A comprehensive comparison of paramedic specific curricula was developed utilising a series of taxonomic frameworks such as Krishnan's (2009) characteristics of a discipline, Shulman's (2005) signature pedagogy, and Reynold's (2004) use of Greenwoods (1984) five succinct characteristics of a profession.

Conclusion

Development of a profession ultimately requires fundamental changes to the traditional processes, structures and methods that govern its teaching and learning. This in turn will determine the successful development of effective communities of professional learning and an embodied professional identity for the profession. The identification, development and application of a defining educational scaffolding such as a signature pedagogy is essential to the growth of paramedicine as a profession. Further research into these educationally driven developments should be of the utmost importance to those interested in the evolution of paramedicine as a genuine profession.

Out-of-hospital cardiac arrest outcomes according to the level of training and the relationship to the patient of the person providing bystander cardiopulmonary resuscitation

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Background

Bystander CPR (byCPR) has been associated with improved outcomes in out-of-hospital cardiac arrest (OHCA). In this study, we describe the relationship to the patient of the person providing byCPR, their level of training and the influence these had on patient outcomes.

Methods

Non-traumatic OHCA who received byCPR and emergency medical services resuscitation from 1 January 2015 to 31 December 2017 were included from the Victorian Ambulance Cardiac Arrest Registry. Ambulance Victoria patient care reports were analysed to ascertain the relationship to the patient of the person providing byCPR and their level of medical qualification. We performed multivariable logistic regression to assess the association between survival to hospital discharge and 1) related-byCPR (family, friends, colleagues), and 2) med-byCPR (health care professional providing byCPR).

Results

We found that 2385 (53.4%) OHCA patients received byCPR from a relative, 468 (10.5%) from a friend or colleague and 1611 (36.1%) from a bystander unrelated to the patient. Of those providing byCPR, 3703 (83%) were laypersons and 761 (17%) were health care professionals. Using multivariable regression analysis, adjusted for known Utstein factors, we found med-byCPR was associated with increased odds of survival to hospital discharge (14.5% vs. 13.8%, OR: 1.4, 95% CI: 1.02–1.92) compared to those who received lay-byCPR. We found no association between the relationship to the patient and survival to hospital discharge.

Conclusions

Bystander CPR from a health care professional was associated with increased survival. This is an important finding and has implications when planning the dispatch of community responders to cardiac arrest patients. Bystander CPR training should be advertised to the public as being most beneficial to their family and friends, as 64% of all byCPR providers were either related to or known to the patient.

Managing patients with COPD in provincial New Zealand: assessing the efficacy of an ambulance referral pathway to primary care for patients in Southland and Otago

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Introduction

The Southland Otago COPD pathway allows ambulance personnel to refer patients with minor to moderate exacerbations of COPD to their GP for a fully funded appointment to provide respiratory care closer to home and avoid unnecessary ED attendance and hospital admission. Referral numbers were lower than expected in the six months following implementation, so a focussed clinical audit was conducted to identify areas of improvement to increase efficacy of the pathway.

Methods

Between May and October 2018, 807 electronic patient report forms (ePRF) were identified with a primary respiratory complaint, of which 230 were determined to be COPD and analysed to identify trends relating to patient demographics, time of presentation and clinical severity. Information was cross-referenced with hospital data to identify correlation between ambulance transport decisions and hospital admissions. Reasons as to why appropriate patients were not referred to primary care were also investigated.

Results

- Of the 230 COPD patients, 110 had mild or moderate symptoms; the rest were severe. Twenty-eight patients were managed in the community; the remaining 87 were transported to hospital, but most were not admitted.
- Average scene times suggest that transport decisions are made early, before effectiveness of on scene treatment has been assessed and deciding if primary care referral is appropriate.
- Only 37% of patients presented during normal clinic hours, so many patients were transported in the absence of available primary care.
- Patient history, respiratory assessment pre- and post-treatment, and relevant social factors were not well recorded in ePRF.

Conclusions

Further education is required to increase awareness of the pathway among ambulance personnel, and improve respiratory assessment, clinical management and documentation. Social factors must be assessed and recorded as these often contribute to transport decisions. Provincial New Zealand requires increased availability of primary care after-hours so that more COPD patients can avoid unnecessary hospital attendance.

General practitioners' perspectives on Advance Care Directives and their accessibility by paramedics when making resuscitation decisions

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Introduction

Paramedics are the first point of contact for cardiac arrests in the community. Some patients have previously completed an Advance Care Directive, usually with the support of their general practitioner (GP), to make their wishes known in the event of their cardiac arrest. This research undertook to examine GPs' confidence of whether Advance Care Directives in their current format are an appropriate means of relaying patient wishes and whether patient wishes are readily accessible and able to be accurately applied by paramedics attending cardiac arrests.

Methods

40 full-time equivalent GPs throughout New Zealand responded to an online survey. Findings are presented from quantitative data and qualitative text-mined sentiment analysis.

Results

86% of GPs surveyed were not confident that Advance Care Directives are accessible to paramedics during cardiac arrest and 62% believed that Advance Care Directives in their current format are inadequate for paramedics making resuscitation decisions. Only 46% of GPs were confident that Advance Care Directives in their current format are correctly applied by paramedics, however 74% reported confidence that paramedics will make appropriate resuscitation decisions regardless of the presence of an Advance Care Directive. Qualitative responses revealed frustration with current documentation systems, nationwide inconsistencies in electronic health record systems and lack of paramedic access to electronic patient information.

Conclusions

The current system for Advance Care Directives is difficult for paramedics to access and does not allow patients' resuscitation wishes to be consistently considered. GPs commended paramedic clinical decision-making in high stakes, low information environments.

Understanding interactions between paramedics and community-dwelling people with dementia

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Background

Community-dwelling people with dementia interact with paramedic services on a regular basis, often due to comorbidities experienced alongside dementia. Interactions occur for various reasons including acute illness, frailty, falls, delirium or transfer from residential care to acute care facilities.

Little is known, however, about the skills or knowledge drawn on by paramedics during such interactions, or further education or resource needs. Recent studies highlight the need for improved dementia education for paramedics focused not only on pathophysiology, but also interpersonal skills for improving communication with people with dementia often during challenging circumstances.

Aims

This study sought to:

- explore experiences of Tasmanian paramedics who provide care in their day-to-day work for people living with dementia; and
- elicit insights and direction from paramedics for development of resources that would enhance their knowledge and understanding of people with dementia.

Methods

The research utilised qualitative methodology involving in-depth, semi-structured interviews with paramedics from across Tasmania. Participants were recruited utilising personal and professional networks and subsequent 'snowball' techniques. Analysis of the interviews identified recurrent concepts which were further refined into key themes.

Results

Key themes identified in the research include:

- paramedic perspectives on primary issues encountered when working with people with dementia
- education and training needs for paramedics relating to the management of people with dementia.

This presentation will report preliminary findings from that study and propose future directions for improved dementia education among paramedics.

Conclusions

Paramedic interactions with people living with dementia can be complex and challenging. Existing clinical practice guidelines do not provide adequate guidance for paramedics when managing people living with dementia. Education for paramedics, both in-service and during undergraduate studies, needs further research in recognition of the complexities identified during this research.

The role of undergraduate education to help paramedics identify vulnerability and family harm

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Introduction

In New Zealand, the incidence of vulnerability to injury and death from family harm remains disproportionately high to the rest of the western world. In 2015, 14 children aged less than 14 years died as a result of family violence and, in 2018, 90,400 reports of concern were made to Oranga Tamariki. With such shocking statistics, it is essential that paramedics can identify and refer people who are vulnerable or at risk of harm. A gap in undergraduate paramedic education was noted, and as a result family harm and vulnerable persons training was incorporated into the Auckland University of Technology undergraduate paramedic program five years ago.

Methods

In this training, paramedic students have a controlled introduction and exposure to concepts around vulnerable people and family harm in New Zealand. With assistance from the New Zealand Police, content delivered includes an introduction to why people remain in situations where family harm is occurring; the impact this makes on generations of whanau exposed; the opportunity to develop an understanding and knowledge of what is 'normal and not normal' for patient presentations; and cultural norms. After this initial introduction, the session further explores 'who' the students profile as a vulnerable person; how to refer vulnerable people under the vulnerable persons pathway as required by the ambulance service; what they should do when someone discloses family harm; and what New Zealand paramedics responsibilities are in relation to reporting those who are vulnerable or have been harmed.

Conclusion

Paramedics play an essential part in identifying and assisting people who are both vulnerable and at risk of family harm.

Therefore, the importance of clear and concise understanding through education and referral of vulnerable people with accurate documentation is imperative, as are support services for both clinicians and patients when they are affected by family harm.

Paramedic students' experiences of clinical placement: a cross-sectional study

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Introduction

Australian paramedic students undertake ambulance clinical placements as part of their university education. Despite research to suggest that clinical placements form a valuable part of any clinical education program, there is little information to determine the relevance, amount and type of experience students are gaining. This study aims to compare ambulance clinical placement experiences across metropolitan, regional and rural locations.

Methods

Thirty-nine students enrolled in an Australian paramedicine program were asked to complete a questionnaire after every clinical placement shift. The questionnaire detailed the location of the shift and sought numerical answers to a series of questions regarding patient numbers, transports and interventions. The quantitative data was analysed to determine average patient numbers across metropolitan, regional and rural placements.

Results

There were 39 students who participated in the study with 112 completed survey responses, including 67 metropolitan, 29 regional and 16 rural. The results showed that for metropolitan shifts, students saw an average of 4.24 patients compared with 3.24 on a regional shift and 1.88 on a rural shift. Approximately 80% of patients were transported to hospital in each region. The occurrence of pharmacological intervention was highest for metropolitan shifts, average of 1.8 patients per shift and 0.8 patients for rural shifts.

Conclusion

This study highlights that there are a greater number of patients seen during metropolitan shifts compared with regional and rural shifts. When allocating clinical placements, the difference in patient numbers and exposure to pharmacological and skill interventions in different regions needs to be taken into account. A better understanding of the clinical placement experience will help education providers map learning outcomes and develop strategies to meet any lack of experience. This will also enable strategies to be developed for the allocation of ambulance clinical placements.

Transition from nurse to paramedic: exploring experiences of nurses who became paramedics in Victoria

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Introduction

Paramedic education has undergone major development in Australia over the past 20 years, moving away from employer-based training to university-based education, comparable to nursing 40 years ago. This has made the question of transition from student to paramedic an issue to be considered. Concepts such as work readiness and theory-practice gap are themes commonly found in the literature when discussing the transition of a student to new professional. Discovering if these concepts are experienced in paramedic transition is essential to determine if universities and employers are meeting the expectations of graduates. The objective of this study was to examine the experiences of nurses who have transitioned to be a paramedic.

Methods

This study used a qualitative research paradigm by means of interpretive phenomenology. Five in-depth semi-structured interviews were conducted then analysed to identify key concepts and themes. Using purposive sampling, five graduates of Federation University who completed their Graduate Diploma of Paramedicine in 2014, and since employed by Ambulance Victoria, were interviewed.

Results

Four major themes were identified from the data collected. Theme one identified expectations in relation to graduate preparedness and issues around transition. Theme two identified the new clinical environment the graduate worked in and the challenges associated with this. Theme three considered the emotional impacts that graduates felt when faced with traumatic and everyday events in paramedicine, which included concepts such as PTSD; resilience; coping strategies; emotional work; stigma; and stress and fatigue are discussed. Finally, theme four considered the tertiary education the graduates completed prior to transitioning to the workplace.

Conclusion

Understanding the experience of transition from nurse to paramedic has helped to identify the enablers and barriers to successful transition as perceived by the graduate. These enablers and barriers will help ambulance services in the transitioning of new graduates into the workforce.

Interprofessional learning and rural paramedic practice

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Introduction

Interprofessional learning is a process of integration and synthesis of knowledge between two or more professions in order to solve problems or explore issues around patient care. Although examination of previous literature reveals a history of collaboration between paramedics and other health care workers, little is known about the ways by which paramedics and different health care professionals interact and construct meaning about an interprofessional approach in the workplace. To address this gap a study was conducted to provide an in-depth understanding of interprofessional learning among rural paramedics.

Methods

In order to conduct this study a constructivist grounded theory methodology was used. Semi-structured interviews based on critical incident technique were conducted with 26 participants including paramedics, ambulance volunteers and other qualified health professionals. The study was set across eight rural locations in the state of Tasmania, Australia. An ongoing process of data analysis progressed through cycles of initial, focused and theoretical coding based on emerging concepts.

Results

This study identified three main concepts around interprofessional learning and rural paramedic practice: relationships, cooperation and operational barriers. These findings have led to the development of a grounded theory of interprofessional learning and rural paramedic practice, that provides insight to the contexts and processes of interprofessional learning and paramedic practice in a rural setting.

Conclusions

Implications for practice stem from recognition that in rural health care settings, informal collaboration between paramedics and other health care workers enhances interprofessional learning and contributes to improved patient care. In adopting a proactive and strategic approach that recognises the importance of these relationships, education providers could introduce programs directed toward supporting the interprofessional nature of rural practice for paramedics at both undergraduate and postgraduate level. Ambulance services could identify operational barriers to interprofessional practice and develop ways to eliminate these or minimise their impact.

Environmental cleanliness of emergency ambulances: a prospective comparative study

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Introduction

In most ambulance services, occupational cleanliness of ambulances and the equipment within them is the responsibility of paramedics. In 2017, NSW Ambulance introduced the Make Ready Model (MRM) into the superstation environment, in which frontline emergency ambulances are systematically cleaned and restocked by non-clinical support staff at the end of each shift. This prospective study aimed to 1) provide a baseline level of ambulance cleanliness; and 2) compare the MRM to a traditional cleaning model (TCM).

Methods

A prospective comparative study was conducted comparing cleanliness of ambulances in the TCM to those in the MRM. Adenosine-triphosphate bioluminescence testing was performed in a pseudo-randomised sample of ambulances. Six 'high touch' test points within each ambulance were systematically sampled. Testing occurred without notice to operational staff. The primary outcome was overall bioburden, measured in radiant light units (RLU). Non-parametric tests were used to assess differences in RLU values between each of the test points, while Poisson multivariate regression was used to compare median overall bioburden between the two groups (TCM and MRM), adjusting for the confounder variable of 14-day ambulance workload.

Results

Sixty-eight ambulances were sampled, 32 from the TCM and 36 from the MRM. When comparing test points, the only one showing a significant difference in RLU was the steering wheel (SCM 1578 vs. MRM 702; $p=0.0012$). With regard to the primary outcome, the MRM was associated with a 35% unadjusted decrease in overall bioburden, and 38% reduction after adjusting for 14-day ambulance workload (ARR 0.62,; 95% CI: 0.61–0.63; $p=0.001$).

Conclusion

The innovative MRM cleaning system significantly improved cleanliness in frontline emergency ambulances. The magnitude of improvement in cleanliness suggests that this cleaning model makes a major contribution to infection control strategies in ambulance services.

A self-triage model for a mobile stroke unit

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Background

Poor specificity of dispatch tools to diagnose stroke can lead to a high yield of stroke mimics for mobile stroke units (MSU). Improving this specificity is key to optimising the service. We explored if MSU clinicians could accurately determine the probability of stroke, based solely on initial dispatch information provided by emergency services call-takers.

Methods

A 'stroke probability' rating was prospectively assigned to consecutive MSU patients between May 2018 and January 2019.

This rating was based only on information provided to the emergency services dispatchers by the caller. 'High' ratings generally included limb weakness +/- cortical signs, 'low' ratings were isolated/non-localising symptoms including vertigo/isolated paraesthesia and 'medium' was in-between. The rating was compared to final ambulance/MSU diagnosis. Low likelihood ratings were compared to medium/high ratings to determine the sensitivity for thrombolysis-eligible cases.

Results

A stroke probability rating was assigned to n=686 patients: 483 (71%) low, 147 (21%) medium, 56 (8%) high. The MSU was cancelled before arrival in 72% of low, 44% medium and 11% of high cases. Of n=392 known diagnoses, 37/51 (73%) high-likelihood patients had a final on-scene diagnosis of stroke/TIA compared to 46/98 (47%) medium, 45/242 (19%) low (chi-square $p < 0.001$). MSU thrombolysis was given in nine (18%), eight (8%) and four (2%) high/medium/low probability cases, respectively (chi-square $p < 0.001$). The negative predictive value for thrombolysis in low-likelihood patients was 0.91. Positive predictive value for thrombolysis in high/medium likelihood patients was 0.20.

Conclusion

Using initial information from emergency services call-takers is a novel strategy for MSU teams to predict stroke likelihood with reasonable accuracy. Improving MSU dispatch specificity would allow the service to have greater availability for higher priority cases.

Publication rates of scientific abstracts submitted to an international scientific conference

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Introduction

Conversion of a scientific conference research abstracts to a full peer-reviewed publication is an important step in the cycle of a research project. Abstracts presented at conferences undergo peer-review, but without the reviewer having full access to the complete methodology and results. Conversion from an abstract to a fully published journal article promotes transparency in research, allowing rigorous interrogation of the study while optimising the potential impact and reach the research might have. Low rates of conversion have been described in many professions, but the phenomenon has not been described in the context of paramedicine research. The object of this study was to investigate the rate of conversion for three years of conference abstracts to full publication.

Methods

The study was conducted in two parts. Part 1 was a retrospective review of published abstracts from the Paramedics Australasia International Conference (PAIC) for the years 2013 to 2015. Part 2 was an electronic survey of authors with PAIC abstracts published in the Australasian Journal of Paramedicine from 2013 to 2015. Those authors who agreed to participate in the survey provided data on abstract conversion, publication details and barriers to publication if not published.

Results

There were 105 abstracts identified, with 54 lead authors responding and willing to participate in the study. The conversion rate from abstract to full publication was 45/105 (42%). The main barriers to converting the abstracts to publication were lack of time; incomplete study; lack of experience or support in producing a manuscript; paper is still under peer-review; and data became obsolete or outdated.

Conclusion

The majority of research abstracts presented at PAIC are not subsequently converted to a full peer-reviewed publication. While lack of time was the most commonly reported barrier, a lack of experience or support in converting the abstract to a manuscript was identified by respondents.

The Community Paramedicine at Clinic Program (CP@clinic): potential impact of adoption in Australia

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Introduction/Aims

In Canada, seniors living in subsidised housing buildings have high chronic disease risk (96% moderate/high diabetes risk; 57% elevated BP). CP@clinic is a paramedic-led, chronic disease prevention and health promotion program held weekly in seniors' subsidised housing. A province-wide randomised controlled trial of CP@clinic showed a total mean reduction of -10.8 emergency ambulance calls/100 units per year ($p < 0.01$) in seniors' buildings with the program, leading to health care savings. Quality of life and chronic disease risk also improved. The objective of this paper was to determine the potential impact of CP@clinic in Australia.

Methods

This was an exploratory paper. An environmental scan of retirement village demographics, 000 call rates, costs and prevalence were executed by reviewing Australian literature and annual ambulance service and government reports. Projections were calculated into Australia's setting based on CP@clinic findings.

Results

A scoping review was conducted. Evidence demonstrates that seniors account for ongoing increased 000 calls. Seniors with low incomes have more chronic illness and disability and need more health care services. 000 call demand has risen exponentially with the ageing population. Recent evidence shows socioeconomic status and 000 call demand are correlated. High ambulance costs (\$894 response + emergency department visit/hospitalisation costs) represent opportunities for savings of \$9834 per 100 seniors through CP@clinic. In Australia, conservative estimates demonstrate that 2272 retirement villages, 180,000 seniors living in retirement homes and 172,800 individuals at risk of chronic disease could benefit from CP@clinic.

Conclusion

With Australia's ageing population and rising numbers/high costs of 000 calls, evidence-based readily adaptable CP@clinic is an innovative approach for paramedic services to improve low-income seniors' health while increasing their capacity for other urgent 000 responses. Adaptations for specific populations (Indigenous groups) could yield high impact. Due to the robust evidence/flexible model of CP@clinic, it could make a significant impact in Australia.

Anaphylaxis recognition: Is there consistency in paramedic and emergency department diagnosis?

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Introduction/Aims

Anaphylaxis is a serious, rapid-onset allergic reaction that can cause death. Early recognition of symptoms is crucial as immediate treatment has been shown to significantly reduce mortality rates and the requirement for further treatment. This study aimed to compare pre-hospital (PH) and emergency department (ED) diagnoses of allergy and anaphylaxis and determine any impact of these diagnoses on hospital admission rates and length of stay.

Methods

This retrospective chart study linked electronic health records from paramedic attendances, public hospital ED presentations and public hospital admissions for all allergy and anaphylaxis cases registered in Tasmania from January 2008 to December 2015. Differences were identified using chi-squared and t-test analyses.

Results

Only cases with complete PH and ED data were included in the study (1553). Significant differences in PH and ED diagnoses of allergy and anaphylaxis were identified ($p < 0.001$), with correspondence in diagnoses observed in 540 cases (34.8%). A diagnosis of anaphylaxis by either PH or ED occurred in 749 cases, with correspondence in diagnoses observed in 40.3% of these. Average ED waiting time to service delivery was significantly longer for cases in which diagnoses did not correspond (33.7 min vs. 26.41 min; $p < 0.001$). Admission to hospital was required in 29.7% of cases, with over 50% of these being anaphylaxis cases. Although differences in diagnoses did not impact rates of hospital admission, mean length of stay was significantly longer for patients with inconsistent PH and ED diagnoses (1.10 days vs. 0.65 days; $p < 0.05$).

Conclusion

These results highlight the challenges faced by health professionals to consistently diagnose anaphylaxis. They also suggest further education regarding recognition of anaphylaxis symptoms may be required, particularly in terms of recognising the transition from an allergic reaction to anaphylaxis.

GippSIM: Can mobile simulation be used to maintain and improve paramedic confidence and capability in rural Victoria

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Introduction/Aims

The GippSIM Mobile Simulation Ambulance project sought to ascertain whether paramedics in rural and remote Victoria would embrace a mobile simulation project that increased their exposure to pre-determined high risk-low frequency clinical situations.

Methods

All current ambulance staff in the Gippsland region of Victoria were invited to participate in pre- and post-deployment surveys using a proprietary online survey tool, and the GippSIM project ran over an 18-month period.

Both surveys collected anonymous demographic data and established participant exposure to pre-determined high risk-low frequency clinical situations in both actual and simulated environments. The surveys also quantified staff attitudes towards informal and formal simulation before and after the GippSIM trial period.

Results

Results showed that participants were open to informal simulation exposure and were enthusiastic to trial the mobile simulation platform. Post-deployment results showed participants had found the GippSIM a valuable experience and a correlation between exposure to the unit and simulation of high risk-low frequency patient types was seen.

Importantly, the post-deployment survey showed a shift in the demographic of respondents, with an increase in higher skilled and experienced cohorts seen. This demonstrates that those required to potentially undertake high risk-low frequency skills had embraced the opportunity to utilise the GippSIM.

Conclusions

This research has shown that providing a mobile platform is a cost-effective way to increase paramedic capability in a range of high risk-low frequency case types. Through this increase in capability ambulance services can anticipate an improvement in both patient safety and the mental health of remote clinicians.

With an increasing requirement for competency-based assessment and CPD points needed for registration, mobile simulation is a viable method for addressing these issues in rural and remote locations.

A novel approach to problem-based learning within an applied paramedicine subject

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Many allied health, medical and nursing higher education programs use problem-based learning (PBL) to assist future practitioners 'bridge the gap' between theory and practice. Commencing in 2015, a cross-disciplinary team of academic and educational design staff sought to progressively transform an applied pharmacology subject within a large, multi-campus undergraduate paramedicine degree. The subject redesign sought to more contemporaneously address course learning outcomes and industry expectations that future paramedics would not merely acquire theoretical knowledge and technical skills within their paramedicine degree, but would possess additional non-technical skills in the areas of problem solving, decision making, reflective practice and a commitment to life-long learning. These requirements are evident within accreditation frameworks for undergraduate paramedicine programs and reflect modern expectations made of university graduates in the workplace.

The subject redesign team formed a view that PBL techniques may help foster higher order non-technical skills among paramedicine students within this subject. PBL has been described as 'a combination of cognitive and social constructivist theories, as developed by Piaget and Vygotsky, respectively' who – among other seminal insights – held that knowledge is not passively acquired but is actively discovered and constructed within dynamic social contexts. For these reasons, PBL approaches were integrated into the practical components of this applied pharmacology subject in order to bridge the theory-practice gap and better prepare students for safe clinical practice in the field of paramedic pharmacology intervention.

This presentation describes the redesign process which has occurred over a four-year period, including the most recent lessons learned in the past 12 months. A five-step model for implementing PBL within applied paramedicine subjects is presented for further consideration.

Statistical literacy for pre-hospital professionals: What do we need to know to understand the research?

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Introduction/Aims

Paramedicine has been asserting itself as a scholarly profession in recent decades, marked by the normalisation of university-delivered education, increase in wages to reflect the complexity, autonomy and responsibility of the industry and, most recently, by becoming the newest role in Australia to be protected as a registered health profession. The concurrent increase in scholarly research is core to paramedicine's claim to professional status, yet paramedics are not well versed in interrogating the claims made in research.

The aim of this paper is to guide pre-hospital staff to recognise and understand the common statistical tests used in research, and better interrogate research documents.

Methods

Five peer-reviewed journals with a primary focus on pre-hospital medical care were identified for data collection either by database subject area or title: Australasian Journal of Paramedicine; International Journal of Emergency Services; Prehospital and Disaster Medicine; Prehospital Emergency Care; and Rural and Remote Health. Articles published from July 2018 to August 2019 were screened, and those presenting statistical analysis (beyond a simple count or percentage) of quantitative research with a focus on pre-hospital care were included in the study.

Results

The incidence of different approaches to statistical analysis in the recent scholarly pre-hospital literature will be presented, along with brief explanations of the common statistical tests applied, their use and assumptions.

Conclusions

In order to confidently and competently interrogate the published literature, paramedics need to become familiar with the different types of data and common statistical tests. This research will enable professional pre-hospital staff and novice researchers to better understand the numerical research data, such as odds ratios, confidence intervals, Cronbach's alpha, and Kappa, and to critique and/or contribute to the growing evidence base.

Perceptions of professional registration in Australian paramedics

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Introduction

In December 2018, paramedics became a self-regulated profession in Australia under the National Registration and Accreditation Scheme for health professionals. This was a significant event for paramedics as the profession was previously unregulated. This study explores perceptions of this process by paramedics. Ethics was granted by the University of Wollongong Human Research Ethics Committee.

Methods

A survey was distributed via social media targeting the estimated 14,600 paramedics in Australia at the time; 422 responses were obtained representing 2.9% of the paramedic workforce. The survey asked 23 questions about paramedics' knowledge and perceptions of registration as well as 12 demographic questions. Five questions elicited qualitative responses which were thematically analysed.

Results

Paramedics had mixed perceptions of the value of registration and a significant number did not appear to understand the details of new regulatory arrangements. Although the majority of paramedics (59%) were in favour of registration, many considered there to be significant drawbacks or did not appear to understand the purpose of regulation. There were varying levels of familiarity with key elements of registration including complaints handling and standards. Eight percent of respondents reported negative mental health impacts from the process of registration. Few practitioners considered registration to be integral to their professional identity and registration was unlikely to change how they identified themselves as paramedics either internally or externally.

Discussion/Conclusion

Self-regulation has long been seen as desirable for paramedics. However, this appears at odds with the feelings of a significant proportion of the workforce. This response is likely influenced by cultural, industrial and educational factors. The outcome of this study suggests the majority of practitioners are prepared for or accept the new regulatory regime but more research is needed to understand the complex relationship between regulation and practitioners.

Gender-based violence and disruptive public health innovation: the need to enhance forensic accountability in emergency medicine

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Introduction/Aims

Gender-based violence (GBV) has considerable prevalence in the world but it is South Africa that has recorded the highest femicide rate in the world. Emergency care providers appear to be well positioned (as first responders) to screen for abuse early but there is little evidence of success or failure in this endeavour. The scholarly relevance of this study was to appreciate the explanation for current and potential practice of GBV prevention by pre-hospital emergency medical systems. The aim of the study was to qualitatively understand, scholarly define, document and strengthen the role and scope of the South African emergency care discipline with regard to domestic violence, within the context of a national and global health sector response to GBV and in particular domestic violence.

Method

The paradigm defining this study was critical theory and the methodological assumptions were founded in grounded theory. Through the methodological triangulation of a quantitative survey, focus group discussions and participant observation of emergency care students, clinicians and educators as well as interviews with EMS managers and regulators, strong propositions emerged.

Results

- Pre-hospital screening for domestic violence is acceptable and effective.
- The domestic violence burden motivates the need for bio-psycho-social responses from emergency care.
- Evidence-based medicine should guide emergency care responses to domestic violence.
- Emergency care challenges and threats to domestic violence responses require organisational and ideological change.
- There exists paradoxical emergency care practice relative to the behavioural pathology of domestic violence.
- The emergency care discipline is in need of role definition, identity and violence re-contextualisation.

Conclusions

Conclusions, in the form of emergent theoretical and transdisciplinary propositions include: typologies of victims, perpetrators and stakeholder responses; the Risk-Need-Responsivity Model of domestic violence intervention in emergency care; an eco-systemic relationship of state and societal expectations; and a 'conceptual compass' for preventing systemic bias in emergency care research.

Interprofessional education in the rural environment as a means enhance multidisciplinary care in future practice: breaking down silos in tertiary health education

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Introduction

Previously, exposure to inter-professional teams was limited and has not been traditionally included in training health disciplines. University-based education produces opportunities for more diverse learning environments and increased exposure to other health disciplines. Interprofessional education (IPE) has been shown to be a useful approach in enabling shared learning among professions, enhancing students' knowledge around role identification and scope of practice

Methods

Western Sydney University implemented an IPE program to promote collaborative approaches to care and improved patient outcomes through interprofessional cooperation. Each IPE consists of a range of simulated, complex health events in a diverse environment. Care of patient(s)/bystanders is primarily provided by paramedicine, nursing and medical students. Simulations are facilitated by experienced practitioners from these professions as well as a multidisciplinary team of specialists (i.e. palliative care, oncology, mental health, midwifery) that students are not traditionally exposed to. Participants are surveyed both pre- and post-event of their perceptions of inter-disciplinary care, other health professionals and their roles, and how they believe this exercise will influence their future delivery of practice. Debriefs are conducted to identify key 'take-home' messages learnt from the simulations as well as the overall experience.

Results

Three IPE events have been held with 88 students participating; 68 students provided feedback evaluating the IPE program. All students participated in the debrief sessions. Findings identified increased understanding of the contributions of other disciplines in enhancing patient care, team approaches and improved cross-discipline communication, indicating a need to engage in collaborate care in future practice. This has been especially notable for paramedicine as other disciplines have traditionally not been exposed to paramedics during pre-qualification education.

Conclusion

Results have shown resounding success in breaking down silos in health education. Creating a collaborative learning environment among health disciplines creates a culture of multi-disciplinary care, enhancing patient care and improving outcomes.

Poster Presentations

Paramedic health status: challenging the status quo – it is not just about mental health

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Aim

To provide an evidence-based approach to improving paramedic health.

Objective

To develop a conceptual model of health improvement by understanding the associations and effect sizes in the five areas of health status, chronic disease, organisational symptomology, caring for self and risk factors.

Hypothesis

All aspects of being a paramedic affect their health status.

Methods

- Defining outcome variables using a conceptual modelling tool, literature review, the descriptive and association analysis.
- Predictor variables were determined by using statistical techniques (Phi and Cramer's V correlation coefficient) and an idiomatic association.
- Binary and ordinal logistic regression was used to develop the most parsimonious model for each outcome variable.

Results

- Health status was predicted by chronic disease, body mass index (BMI), age, psychological distress (K10), job satisfaction, busier stations, a negative work-related health culture, sitting hours and sleep.
- Chronic disease was predicted by BMI, sleep quality, anxiety, age and shift work years, fatigue, body pain and K10.
- Organisational symptomology was predicted by age, employment type, anxiety, fatigue, family stressors, self-reported health, K10, chronic disease, long term conditions, job satisfaction, gender and sitting hours.
- Caring for self was predicted by alcohol consumption, job satisfaction, age, disability, shift work years, self-reported health, BMI, rest breaks, diet, employment type, exercise hours, thoughts of leaving and K10.

Risk factors were predicted by the majority of the above.

Conclusion

A broad conceptual model of understanding paramedic health can assist in overcoming the challenges of improving their health status, which can be predicted by elements of the work they do, the format of that work and the working and organisational environment.

Using the wisdom of the Elders to prepare student paramedics for the mental health challenges of the profession

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This study investigated the preparedness of student paramedics for the mental health challenges of the paramedic profession and identifies the coping strategies used by veteran paramedics to successfully meet these challenges.

Twenty semi-structured interviews with veteran paramedics, each with a minimum 10 years paramedic experience from across Australia and New Zealand, were conducted to gain an understanding of their experiences, mental health coping strategies and advice for student paramedics.

Results from the interviews were validated by three focus groups comprised of six veteran paramedics each, representative of the geographic spread.

The semi-structured interviews provided valuable insights into the experiences and strategies used to aid the survival of the veterans throughout their careers. Within the interviews, 70% of participants expressed a sincere love for the paramedic role, and 70% identified black humour as the coping strategy most used by themselves and colleagues.

In addition, extensive advice was given to student paramedics based on the veterans lived experiences. This advice comprised of three themes: support, health and the profession and can be applied to metro, rural and remote practices.

The findings of the study indicate that the preparation of student paramedics for the mental health challenges of the paramedic profession throughout the undergraduate curriculum could be advantageous. By utilising the relatable data collected on anticipation, confidence and fears, the advice offered by the veteran paramedics can be included within undergraduate paramedic curricula and delivered by sharing the lived experiences of the veteran paramedics. These lived experiences are highly credible and an opportunity for veterans to contribute positively to the future of paramedicine. Guidelines for their inclusion to the paramedic curriculum have been prepared to facilitate the knowledge and commence the development of conscious coping strategies by student paramedics during their learning phase.

Development of a tool to monitor paramedic clinical placements

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Introduction

This paper discusses the use of an online tool CompTracker© that was trialed within a cohort of 330 first year and second year paramedic students studying at an Australian university. CompTracker© is an online platform that is used to link the student, preceptor and academic in a time sensitive manner during their clinical placement. It allows for preceptors to identify and assess clinical competencies and the student to reflect after each case is completed on placement. The online tool was initially piloted, and the tool remodeled upon several attempts to improve its overall functionality and relevance for the placement learning experience. This study aims to educate and inform other health disciplines who may have an interest in using online tools for competency tracking and education in diverse workplaces.

Methods

Multiple surveys were conducted over a three-year period using both Likert 5-point scales and open-ended questions to evaluate 330 first- and second-year students and 261 preceptors' experiences

Results

Of the 54 student responses, 92% of students felt the tool was useful, and 67% felt it was easy to use. Within the preceptor results, 63 ± 2% of preceptors felt the CompTracker© was preferred over the traditional paper-based methods.

Conclusion

CompTracker© is a beneficial tool that can be used to support students and preceptors in clinical placement. The flexibility of the tool makes it adaptable to most clinical workplaces. This online competency tool should be considered across any workplace that requires the use of competency based clinical assessment and used in place of traditional paper-based portfolios.

Impact incontinence – Can the ambulance be at the top of the cliff?

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A quarter of New Zealand's population lives with a continence problem, and the embarrassment and 'taboo' around incontinence means that it is not openly discussed. It is believed that incontinence is a contributing factor to falls in the older adult. Ambulance clinicians frequently attend patients who fall and are in a unique position to ask about continence concerns as part of their falls assessment.

A retrospective review was completed of teaching materials concerning falls assessment and incontinence, as taught in 2018 by three ambulance education providers in New Zealand.

Currently in the New Zealand ambulance education sector, no training is provided for ambulance clinicians to ask patients if incontinence contributed to their fall. A change in education should include the introduction of specific questions regarding incontinence. A routine continence assessment could help to 'normalise' the 'taboo' and uncomfortable feelings about 'hidden' incontinence and result in improved patient care. Furthermore, assessing for the presence of incontinence and making onward referrals as appropriate, provides an opportunity for prevention of further falls.

Ambulance clinicians are in a unique position to further refine their falls assessment to include a continence screening tool. Education will promote this practice change and improve care for patients who fall in the community.

A WW1 advanced dressing station: What can we learn from the past?

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It is 100 years since the World War 1, an industrialised war of machine guns and artillery, with enormous casualties and horrendous traumatic injuries. Young New Zealanders and Australians fought on the Western Front and also served in the field ambulance, the military medical services responsible for the evacuation and treatment of their injured mates. An advanced dressing station (ADS) was a foremost stage in this system, responsible for recognising and treating immediate life-threatening injuries. What were the experiences of the young men who worked in these settings, and what can a modern paramedic learn from them?

A WW1 photograph of a particular ADS was closely studied, the historical setting was investigated from official war diaries and records, contemporary accounts of men who served in the field ambulance were examined. A personal trip to France in 2018 located and explored the original building.

The setting was open mobile warfare in the Somme, France, in April 1918. The WW1 photograph shows a two-storey stone-faced house marked by a Red Cross flag. An ambulance vehicle with a silver fern painted on the cab-door is parked outside. Ten soldiers, stretcher-bearers and men from the engineering corps work at protecting the ADS with sandbags. Over 1800 wounded men passed through this ADS across two months. Contemporary accounts reveal flexibility and responsiveness, highly structured systems of care, efficient teamwork and hard work, immediate essential care only for the injured with prompt evacuation and personal resilience.

This is a remarkable century-old photograph of an ADS. Although WW1 treatment and evacuation methods were relatively primitive compared to modern services, a powerful clinical efficiency was achieved through practiced systems of care, through close teamwork, commitment and resilience – qualities as relevant today as they were then. We will remember them.

Prevalence of burnout in paramedics: a systematic review

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Introduction

Paramedic wellness is an increasing priority within the profession. Burnout, posited as being a substantial issue for paramedics, has been described as having areas of 'emotional exhaustion, depersonalisation, and reduced personal accomplishment' that affect all aspects of life. Prevalence of burnout is unclear, hampering evaluation of protective initiatives aimed at improving paramedic wellness. The aim of this systematic review was to identify the prevalence of burnout in paramedic populations.

Methods

A systematic review was registered via Prospero and conducted in accordance with PRISMA guidelines. Independent, systematic searches were conducted of Medline, EMBASE, CINAHL, ERIC, PsychINFO and PsychARTICLES. Abstract screening and selection of articles was undertaken with good agreement. Quality assessment of included articles was conducted using Hoy's validated quality assessment tool for prevalence studies, with excellent inter-rater agreement ($k=0.9$). Qualitative synthesis of included studies was performed. Each step of the process was performed independently by two authors, with a third arbitrating disputes as required.

Results

412 abstracts were identified and five studies met inclusion criteria. Two were from the US, and one each from Australia, South Africa and Israel. Burnout measurement varied, though all were validated; three used the Copenhagen Burnout Inventory (CBI), one used Maslach's Burnout Inventory (MBI) and one the General Burnout Measure (GBM). Prevalence of burnout across the five studies ranged between 18-63%. Higher prevalence was reported in those studies using the CBI (38%, 60% and 63%), while lower prevalence was seen with other tools (MBI 18%, BGM 16%). Included studies were of low to moderate quality, thus reducing the strength of this evidence.

Conclusion

The prevalence of burnout in paramedics varies from 18–63%. The existing evidence describing burnout in paramedics is weak; research of good methodological rigour is needed to quantify prevalence of burnout, thus providing a reliable baseline against which protective interventions could be measured.

Factors influencing emergency medical service delays in suspected ST-elevation myocardial infarction

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Objective

To assess the impact of patient and system characteristics on emergency medical service (EMS) delays prior to arrival at hospital in suspected ST-elevation myocardial infarction (STEMI).

Methods

We included 1739 patients who presented with suspected STEMI to the EMS in Melbourne, Australia between October 2011 and January 2014. Our primary outcome measure was call-to-hospital time, defined as the time in minutes from emergency call to hospital arrival. We examined the association of patient and system characteristics on call-to-hospital time using multivariable linear regression, adjusting for distance to hospital.

Results

The mean call-to-hospital time was 60.1 minutes (SD 20.5) and the median travel distance was 13.0 kilometres (IQR 7.2–23.1). In the multivariable model, patient characteristics associated with longer call-to-hospital time were age ≥ 75 years (2.3 minutes; 95% CI: 0.6, 4.0), female sex (1.9 minutes; 95% CI: 0.3, 3.4), pre-existing mental health disorder (4.0 minutes; 95% CI: 1.9, 6.1) or musculoskeletal disease (2.7 minutes; 95% CI: 1.0, 4.4), absence of chest pain (3.0 minutes; 95% CI: 1.1, 4.8), hypotension (1.8 minutes; 95% CI: 0.3, 3.3), oxygen desaturation (3.7 minutes; 95% CI: 2.0, 5.4), altered mental status (3.0 minutes; 95% CI: 1.2, 4.8) and cardiac arrest (4.5 minutes; 95% CI: 1.6, 6.4). System factors associated with call-to-hospital time include lower dispatch priority (12.7 minutes; 95% CI: 9.0, 16.5), 12-lead electrocardiography (ECG) capable ambulance first on scene (4.5 minutes; 95% CI: 3.1, 5.8), and time and day of call. Patients who were not initially attended by a 12-lead capable ambulance were less likely to receive a 12-lead ECG within 10 minutes (18.5% vs. 71.0%; $p < 0.001$).

Conclusion

A range of patient and system factors may influence prehospital system delay in STEMI. However, optimising dispatch prioritisation and widespread availability of prehospital 12-lead ECG could lead to substantial reduction in time to treatment.

Is ketamine safe for the pre-hospital sedation of patients with excited delirium secondary to sympathomimetic toxicity?

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Introduction

Excited delirium secondary to sympathomimetic toxicity is an acute life-threatening emergency increasingly seen in the prehospital setting. Patients suffering from this derangement present with severe behavioural disturbances that can distract from the imminent risks of metabolic, respiratory and cardiovascular collapse resulting in sudden death. Increasingly, ketamine is used in the prehospital setting as a fast-acting sedating agent for these patients, however, little is known about its safety and efficacy. Despite this, New Zealand ambulance services have deployed ketamine as the sedating agent for this sub-group of patients since 2016.

The aim of this systematic review is to evaluate the safety and efficacy of intramuscular ketamine administration in this sub-group of patients.

Methods

Health databases searched included CINAHL and Medline (via EBSCO) and Scopus, Cochrane and Evidence Based Medicine Reviews (via OVID). Key terms used were 'ketamine' AND 'excited delirium' OR 'sympathomimetic' AND 'toxidrome' OR 'toxicity' AND 'ambulance' OR 'pre-hospital' OR 'emergency ambulance services' OR 'EMS' OR 'paramedics' OR 'out of hospital'.

Results

This systematic review identified four retrospective reviews of patient case reports where ketamine was deployed as the prehospital sedating agent. In total these reviews assessed the presentation, management and outcomes of 67 patients. Two systematic reviews were identified; one considering the pharmacological profile of ketamine and the other evaluating the epidemiology and pathophysiology of excited delirium.

There is a paucity of research in this area. Although ketamine presents some risks, the reviewed evidence demonstrates its safety as a rapid prehospital sedating agent when used by trained paramedics for excited delirium secondary to sympathomimetic toxicity.

Conclusion

There is growing evidence to support the pre-hospital use of ketamine for sedation in patients with excited delirium secondary to sympathomimetic toxicity. Large cohort studies are needed to conclusively prove the efficacy and safety of ketamine in this setting.

Blood products in the pre-hospital setting: Are they safe and effective?

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Introduction

Catastrophic or life-threatening haemorrhage is recognised as the leading cause of preventable death in trauma patients. Massive transfusion protocols are common within hospital settings, however, the use and impact of blood products in the pre-hospital field is poorly understood. In New Zealand, blood products are only available via Helicopter Emergency Medical Services (HEMS).

Aim

To elucidate if pre-hospital blood products improve survival in trauma patients and comment on their utility and safety.

Methods

Electronic databases Cochrane, Medline, CINAHL, Scopus, PubMed, Biomedical Reference collection (OVID and EBSCO) and Google Scholar were searched, with key terms 'blood' OR 'blood products' AND 'prehospital' OR 'HEMS' OR 'paramedic' OR 'emergency medical services'. Inclusion criteria: English language, full text journal articles and 10-year recency (2009 to 2019).

Results

Six retrospective cohort studies met inclusion criteria. All studies examined only those patients with suspected or confirmed haemorrhagic shock following trauma in a civilian setting. A total of 2610 patients were included in the review of which 856 patients received pre-hospital blood products. The administration of pre-hospital blood products did not significantly reduce patient mortality 30 days post-trauma. An insignificant trend towards decreased mortality within 24-hours of trauma was noted among those patients who received blood products. No adverse incidents occurred in all studies.

Conclusion

The implementation of pre-hospital blood products is feasible and safe. Early transfusion of blood products did not reduce 30-day mortality. A small trend of reduced 24-hour mortality was noted, however, this decrease was not statistically significant. Currently there is insufficient evidence to suggest that ambulance services move toward routine use of blood products in hypovolaemic trauma patients.

The Paramedic Student Survival Kit: a novel project-based learning approach

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Introduction

The aim of creating the Paramedic Student Survival Kit was to produce an informative, compact and portable document to prioritise student paramedic health and wellbeing during clinical placement. It provided evidenced-based information about potential issues, concerns and risks from previous students' placement experiences and was a novel resource.

Methods

Highly motivated third-year paramedicine students (n=34) at Griffith University volunteered to participate in the collaboration, with 2 to 3 students per topic, graphic designing team, all working alongside the course convener to create the survival kit.

The survival kit was compact yet succinct, the same size as a business card. The card unfolded to an A4 size document to reveal the full survival kit. The course convenor offered the students wellbeing topics that students may encounter while on clinical placement and encouraged students to brainstorm more topics that were essential for the survival kit.

Results

- The toolkit was extremely well received by students preparing for placement and has become an essential for all Griffith University paramedicine students.
- The impact of conducting this project enhanced the students' relationship with the course convener thus building a professional rapport and respect between paramedic academic and student.
- The time spent producing the document and the project's collaborative aspect were vital to the quality and depth of the final product.

Conclusions

- The survival kit enriched students' clinical placement experience by refining skills required of an expert paramedic such as advanced communication, negotiation, organisation and judgement skills.
- This was a project-based initiative and completely student-driven. Evidence supports this approach.
- Students who participated reported the benefits of undertaking extracurricular activities of this nature to be an exceptional addition to their learning and was added to their professional resume.

How effective are paramedics at interpreting ECGs in order to recognise STEMI?

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Background

The use of an out-of-hospital 12-lead ECG has long been the salient test used when assessing ischaemic sounding chest pain and is the only clinical tool that allows for early diagnosis and triage of acute coronary syndromes. This ultimately determines whether urgent percutaneous coronary intervention is indicated. Therefore, the ability of paramedics to accurately interpret 12-lead ECGs is vital and has the potential to positively influence patient outcomes. However, within the Ambulance Victoria context, the Zoll monitors provide paramedics with an automated STEMI diagnosis. Zoll reports the Inovise 12L Interpretive Algorithm can correctly classify an individual as having a STEMI in 89% of cases (sensitivity).

Objective

The objective of this review was to summarise the existing literature pertaining to the ability of paramedics to diagnose STEMI using 12-lead ECG in out-of-hospital setting.

Methods

Ovid Medline, Ovid Emcare and CINAHL Plus were all searched using synonyms of keywords such as 'paramedic', 'ECG', 'diagnosis' and 'STEMI'. Two investigators independently screened the titles, abstracts and full text of the articles against the inclusion and exclusion criteria and discussed conflicts that arose.

Results

Of the initial 2126 articles, nine studies were relevant and examined the ability of paramedics to identify STEMI on out-of-hospital ECGs. Results indicated that increased additional education provided to paramedics, and the implementation of protocols and/or tools demonstrated positive results regarding STEMI recognition. Furthermore, paramedic sensitivity for STEMI was often reported to be higher than that of Zoll's algorithm.

Conclusion

Seven of the 9 articles had a strong general consensus that paramedics can independently interpret 12-lead ECGs to diagnose STEMI, however not all studies were of good quality. While the importance of the out-of-hospital ECG in the setting of STEMI is well documented, the ability of paramedics to independently interpret them is less so and requires further study.

Severe burns: an educational overview?

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This poster is an educational overview investigating the current literature on the epidemiology, pathophysiology and pre-hospital treatment of severe burns. The research incorporated into the poster was obtained through a range of peer-reviewed sources, predominantly PubMed and Cochrane Library. Key terms used in the research strategy were 'severe burns', 'pathophysiology' and 'prehospital management'. Mesh terms were used in the Cochrane Library to expand the scope of the research process.

This poster explores the basic anatomy of the skin and its three layers (dermis, epidermis and hypodermis) and the localised physiological responses that occur with burn injury. In particular, the poster investigates how severe burn injury leads to increased capillary leak due to release of inflammatory mediators and resulting oedema. This is illustrated in the findings of a study by Leape et al, who found the water content of a full thickness burn to increase by 70–80% within 30 minutes of injury.

The systemic consequences of severe burns include reduced cardiac output due to reduced plasma volume, reduced myocardial contractility, rebound tachycardia after 48 hours, end-organ hypoperfusion and potential airway oedema and obstruction.

Depression in cardiac contractility is thought to be due to the release of macrophage migration inhibitor factor, as investigated in a study by Willis et al. Treatment of severe burns in the prehospital setting primarily involves pain management (with analgesia) and fluid resuscitation to restore blood volume. In the setting of possible inhalation burns, the airway should be stabilised immediately. The research behind the use of active cooling in burns is also investigated, with one study finding a direct link between reduced body temperature due to pre-hospital active cooling and increased mortality in severe burn patients.

A comparison of the response time of emergency medical services in urban versus rural areas of Saudi Arabia

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Introduction

Research indicates that the quality of emergency medical services (EMS) in high-, middle-, and low-income countries differs between rural and urban areas. The aim of this study is to compare key measures of quality for EMS operating in urban and rural areas of Saudi Arabia.

Methods

We conducted a retrospective cross-sectional study of patients using the Red Crescent EMS Saudi Arabia. A random sampling method was used to select ambulance records included in this study. Demographic data was collected on the patients, as well as measures such as response time and transport time. Data were compared between the urban and rural groups using t-tests and chi-square tests. The effect of time of call and scene location on the response time and duration time were analysed.

Results

800 patients were included in the final analysis (n=400 in the urban group, n=400 in the rural group). When compared to the urban areas, cases in the rural area had significantly longer response times and duration times (median response time: 15 vs. 22 minutes, median duration time: 43 vs. 62 minutes). The time of call affected the response time in both urban ($p=0.008$, $F=4.841$) and rural groups ($p=0.038$, $F=3.297$). Scene location affected the duration time in urban areas ($p=0.000$, $F=20.347$) but not for the rural areas ($p=0.477$, $F=0.742$). Type of injury affected the duration time in urban areas ($p=0.008$, $F=2.56$) but not for the rural areas ($p=0.939$, $F=0.415$).

Conclusion

The findings identify a number of differences between urban and rural areas with respect to the response time and duration time, and that some factors affecting the response time and duration time were also different. Type of injury and scene location affected the duration times in urban areas, while time of call affected the response time in both urban and rural areas.

Environmental cleanliness standards for emergency ambulances: a scoping review

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Introduction

Healthcare-acquired infection (HAI) is a major concern in contemporary health care with ~200,000 cases annually in Australia. Environmental cleanliness is key in the fight against HAI, but the pre-hospital setting provides limited research into cleaning practices and compliance with infection-control guidelines. A small body of research is emerging investigating surface cleanliness of high touch areas in ambulances, but lack of acceptable standards of cleanliness impacts this research.

The aim of this scoping review is to thoroughly understand infection control practices specific to cleanliness of emergency ambulances.

Methods

This scoping review employed the Joanna Briggs Institute methodology: a three-step search strategy was utilised. An initial limited search of PubMed and CINAHL was followed by analysis of text words in titles and abstracts, and index terms used to describe articles. A second search using all identified keywords was undertaken in PubMed, CINAHL, Embase, Scopus, Cochrane Library and Web of Science. Thirdly, the reference lists were searched for additional studies. Each step was performed independently by two authors, with a third arbitrating disputes.

Results

From 2247 identified abstracts, 2106 studies were screened, resulting in 31 full-text studies assessed for eligibility. Eight studies were excluded (conference abstract; focus on non-emergency ambulances or dedicated transfer ambulances) resulting in 23 studies meeting the inclusion criteria (full-text, peer-reviewed journal or grey literature through ProQuest; English language publication; description of emergency ambulance cleanliness). Six were from the US, two from the UK, three from Australia, three from Germany, two from Iran and one each from Italy, Saudi Arabia, Korea, Poland, Spain, Denmark and Ireland. Twenty were original research articles and three were commentaries.

Conclusion

Environmental cleanliness literature relating to the prehospital arena is increasing but is still significantly less than other health fields. The variability in jurisdiction, study design and outcome measures impact comparison, future standards and possible interventions.