



Grey areas: New Zealand ambulance personnel's experiences of challenging resuscitation decision-making



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ARTICLE INFO

Article history:

Received 22 May 2017

Received in revised form 30 July 2017

Accepted 4 August 2017

Keywords:

Cardiac arrest

Emergency medical services

Cardiopulmonary resuscitation

Clinical decision-making

Paramedics

Prehospital care

Qualitative research

Interpretative phenomenological analysis

ABSTRACT

Introduction: When faced with a patient in cardiac arrest, ambulance personnel must rapidly make complex decisions with limited information. Much of the research examining decisions to commence, continue, withhold or terminate resuscitation has used retrospective audits of registry data and clinical documentation. This study offers a provider-perspective which characterises uncertainty and highlights clinical, cognitive, emotional and physical demands associated with decision-making in the cardiac arrest context.

Method: Semi-structured interviews with a purposive sample of sixteen demographically diverse ambulance personnel, currently employed in a variety of emergency ambulance response roles across New Zealand.

Results: All participants readily identified clinical, cognitive, emotional and ethical challenges associated with resuscitation decision-making. Four main themes were identified: grey areas; exceptional cases; scene challenges; and personal responses. A lack of information or a mix of favourable and unfavourable prognostic factors created decision-making uncertainty or "grey areas". Exceptional cases such as first-encounters also increased uncertainty and presented emotional, ethical and clinical challenges. Cardiac arrest scenes were often challenging, and participants described managing bystander expectations and responses and logistical limitations including adverse environmental conditions, fatigue and task-overload, and crew resource management.

Conclusion: This unique research presents a provider-perspective on the challenges faced by ambulance personnel deciding to commence, continue, withhold or terminate resuscitation efforts. Knowledge of personal values and strategies for managing personal responses appear to be central to certainty and coping. Simulated training should move beyond resuscitation task performance, to incorporate challenging elements and encourage ambulance personnel to explore their personal values, stressors and coping strategies.

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1. Introduction

For the majority of out of hospital cardiac arrest patients, the event heralds imminent death [1]. For those with a reversible cause, prompt initiation of the aptly-named chain of survival is vital, as delays reduce the odds of return of circulation, and increase subsequent morbidity and mortality [2]. Emergency ambulance staff attending cardiac arrests are often expected to make rapid judgements in demanding circumstances, with limited available information [3]. With increasingly aged and comorbid populations, initiation of resuscitation or prolonged resuscitation efforts may not be appropriate for all patients found in cardiac

arrest in the community [4,5]. In recognition of the limitations of resuscitation, select emergency ambulance providers in many countries are authorised to commence, continue, withhold or terminate resuscitation in accordance with local guidelines [6,7]. Evidence-based rules for termination of resuscitation have been developed and implemented [6,8], but intra-arrest prognostication can be fraught with uncertainty and there is a lack of international consensus [5,9,10].

Resuscitation decision-making research designs commonly involve retrospective analysis of cardiac registry data and clinical records, and although this has significant utility in associating arrest variables with patient outcomes, it may not capture the complex and idiosyncratic experience of resuscitation decision-makers [11]. The purpose of this study was to identify the clinical, ethical, cognitive and emotional challenges that emergency ambulance personnel experience when making decisions to commence,

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continue, withhold or terminate resuscitation. Identifying challenges encountered by emergency ambulance personnel called to patients in cardiac arrest has important implications for guideline development and the preparation and support of ambulance personnel.

1.1. Research setting

In New Zealand, cardiac arrests in the community are usually attended by ambulance personnel with varying levels of qualification and skill authorisation. Intensive Care Paramedics are the definitive prehospital resuscitation providers attending most community cardiac arrests, although basic life support 'co-responders' – often the New Zealand Fire Service – are commonly first on scene. Medical advisors can be consulted by phone, but doctors rarely attend emergency callouts [7,12].

2. Method

2.1. Recruitment and data collection

A purposive quota sample of ambulance personnel currently employed in emergency clinical roles across New Zealand, was recruited via an email-advertisement sent-out by St John New Zealand. All interviews were conducted face-to-face at a mutually agreed location and recorded using a digital recording device. Probes from a pilot-tested interview guide were used to elicit specific narratives of challenging decisions to commence, continue, withhold or terminate resuscitation. All interviews were conducted and transcribed by the first author, an experienced research interviewer with a dual background in emergency nursing and psychology.

2.2. Methodology & data analysis

An interpretative phenomenological analysis (IPA) methodology informed research design and data analysis. This methodology is particularly suited to exploring participant experiences of complex and significant life events, allowing detailed examination of thoughts, feeling and actions [13]. The researcher seeks to understand the meaning that individual participants have attributed to their experiences, creating a double hermeneutic (the researcher making-sense of the participant's sense-making) [14]. A rigorous and auditable approach to data analysis – outlined in Fig. 1 – resulted in the development of superordinate and subordinate

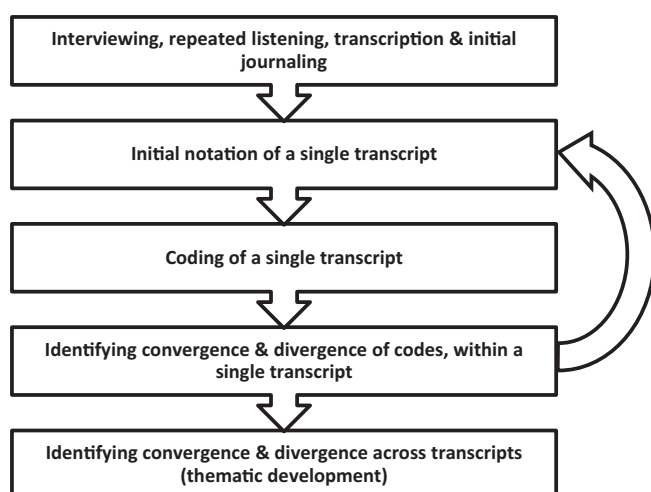


Fig. 1. Stages of data analysis.

Table 1
New Zealand ambulance levels of practice.

| Practice level | Qualification (or equivalent) |
|------------------------------------|----------------------------------------------------------------------------------|
| First Responder (FR) | Short-course in advanced first aid |
| Emergency Medical Technician (EMT) | National Diploma in Ambulance |
| Paramedic (P) | Bachelor of Health Science in Paramedicine |
| Intensive Care Paramedic (ICP) | Bachelor of Health Science in Paramedicine ± Postgraduate Certificate or Diploma |

themes. A combination of strategies and tools were used during data analysis, including reflexive journaling [15], manual coding on printed transcripts and use of Nvivo 11 [16]. Whilst data analysis was primarily undertaken by the first author, JS and MG regularly cross-checked coding and critically questioned the development of themes Table 1.

3. Results

Sixteen ambulance personnel from geographically diverse areas of New Zealand volunteered and all were interviewed. Select demographic information is presented in Table 2. Highly-experienced Intensive Care Paramedics readily volunteered for inclusion in the study, but further, targeted recruitment was required to ensure less-experienced provider perspectives were included in the sample. Interviews were conducted in private spaces on the university campus and in participant homes and workplaces and ran from 55 to 145 min (\bar{x} = 90 min). Four participants requested review of their interview transcripts, with no resulting changes.

All participants readily recalled experiences of resuscitation decision-making which were challenging, and examples were often provided without prompting. Four over-arching themes captured challenging decision-making:

1. Grey areas – situations where key information was unavailable or conflicting
2. Exceptional cases – first-encounters, arrests of secondary aetiology and those involving children or young people
3. Scene challenges – including the expectations and responses of bystanders, limited resources or difficult patient access
4. Personal responses – the idiosyncratic impact of individual values and emotional triggers.

These major themes and their associated subthemes are presented in Table 3, along with source frequency and illustrative quotes. The meaning and importance of these themes is discussed in the following section, with generous anonymised verbatim extracts, to provide grounding in data.

3.1. Grey areas

“With cardiac arrests you go along and think ‘Yip! It’s a goer’ or ‘No it’s not.’ But then you get the grey areas.”
[Morgan, ICP, 38 year’s experience]

Incomplete knowledge of key background information about the patient and circumstances of arrest, or a mix of favourable and poor prognostic factors would create what participants described as “grey areas”. Such incomplete or conflicting information could make decision-making more challenging:

“I guess the ones that are a little bit tough at times are the ones where you don’t really know, it was not witnessed. Or perhaps it was sort-of witnessed but nothing’s been done in the fifteen minutes or ten minutes that you’ve responded to the scene. And

Table 2
Participant demographics.

| Practice Level | | Age | | Gender | | Ethnicity | |
|------------------------------------|---|-------|---|--------|---|---------------------|----|
| First Responder (FR) | 1 | <25 | 4 | Female | 8 | NZ European | 13 |
| Emergency Medical Technician (EMT) | 3 | 25–34 | 4 | Male | 8 | NZ European & Māori | 2 |
| Paramedic (P) | 3 | 35–44 | 3 | | | Other European | 1 |
| Intensive Care Paramedic (ICP) | 9 | 45–54 | 3 | | | | |
| | | 55–64 | 2 | | | | |

Table 3
Key themes characterising challenging resuscitation decision-making.

| THEMES | Subthemes | Sources | Illustrative quotes |
|-----------------------|------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Grey areas | Missing puzzle pieces | 14 | "And I think one aspect that we can't ever ascertain is – even if it's a witnessed collapse – we don't definitively know at what point there's been a loss of cardiac output. There could have been a collapse, they could have had a very low perfusing state, where they're still getting end-organ perfusion, and we don't know for sure." Jessie, ICP, 20 years' experience |
| | Mixed prognostic factors | 13 | "I remember standing at the feet, going OK, she is elderly and she does have this medication, but it was a witnessed collapsed. They didn't do bystander CPR but our response time was like two minutes. And I remember thinking this potentially. And then I remember turning back and looking at this blood and going nope. That's not good." Hayden, P, 3 years' experience |
| 2. Exceptional cases | Firsts | 12 | "I remember one of the first people I saw that was dead from a natural cause [...] And I asked [ICP colleague] 'What are we doing? Why aren't we doing anything?' And I didn't get that. But he was dead. So that's just experience, I suppose. I didn't really get a lot of answers. It took a while – some months or years of experience – to figure that out." Ash, ICP, 30 years' experience |
| | Secondary cardiac arrests Young people & children | 11 12 | "One I went to – we were told that he was hanging – the firemen cut him down. It was my first cardiac arrest post-hanging as well, so I was a little bit [childlike, as if unsure] 'I don't know!'" Taylor, ICP, 7 years' experience "... generally when people are getting really, really stuck in, it's the younger the person the more emotional people are, the more they want to help and save their life." Jessie, ICP, 20 years' experience |
| 3. Scene challenges | Having an audience | 16 | "So in a public place it creates a few difficulties because you have a lot of random people around who are a bit nosy and want to have a look. But then you also have the shock-factor of people being a bit taken-aback by the whole situation, somebody's dying in front of them." Charlie, P, 6 years' experience " |
| | Logistical limitations | 16 | ". . . yeah, we were just about exhausted, by then. Because you can't do much. There's only two of you so once you get an airway in, that's one of you stuck doing that. And then there's CPR – you don't interrupt CPR for anything, so everything else tends to go a little bit more by the wayside." Taylor, ICP, 7 years' experience |
| 4. Personal responses | Managing emotions | 16 | "There's certain jobs that you certainly get upset about. But you have to be very accepting, in this job, because people are always going to die. We can't save everybody, whilst we do our best. You have to have that approach a bit, if you did take it too personally you wouldn't last and you wouldn't be effective in what you do." Jessie, ICP, 20 years' experience |
| | Personal locus | 16 | "I mean, personally if I'm in a flat-line, please leave me there. Don't mess with me. As much as you shouldn't impose your values on a patient, I think it's actually quite important, to do that and turn it into 'Well, what would you want for you, or your family?' It gives you a bit of a locus, if you like." Ryan, ICP, 25 years' experience |

the expectation's that you'll do something, but nothing's been done. And that's hard. So you [sigh] perhaps have a look and perhaps get them on the floor, off the bed and do a little bit of CPR. But you're also aware that by doing that you're creating hope. But you're doing that because you're not sure of the timings, until you get more of the history, so you're doing some stuff. So that can be quite tough at times, eh?"

[Ash, ICP, 30 years' experience]

In the face of limited or conflicting information, participants would commence or continue resuscitation and simultaneously attempt to gather further information, or delegate another crew member to this task. Working in this 'grey area' without clear signs of hope or hopelessness, appeared to be a frustrating experience. Participants required an intrinsically-determined amount of concordant verifiable information to withhold or terminate resuscitation, but this was idiosyncratic and the challenges presented in the remaining three themes also exerted an impact on decision-making certainty and actions taken.

3.2. Exceptional cases

Unfamiliar, unusual or unexpected arrest situations were characterised as more challenging, requiring more protracted information-gathering and again, often leading participants to abdicate or delay decision-making, and commence or continue resuscitation. First encounters were often spontaneously described, and associated with doubt or limited comprehension. Secondary cardiac arrests – due to choking, trauma, drowning,

poisoning, hypovolaemia and hanging – were also associated with multiple challenging elements. They were infrequently encountered, typically sudden and unexpected and could involve young people or children. Arrests secondary to suicide, trauma or violent crime were often volatile, crew safety uncertain and information incomplete. In the below example, Ryan persisted for some time, in an attempt to resuscitate a young patient who had drowned, and expressed relief when the patient finally became asystolic – apparently providing physiological confirmation that termination was appropriate.

"If it was a cardiac aetiology, if you like, then it would be different. However it was secondary to a hypoxia and in terms of survivability etc. once I saw the flatline, to be fair I was quite happy, you know? Because at least you know that is – that's the full stop."

[Ryan, ICP, 25 years' experience]

Cardiac arrests involving children or young people were rarely encountered but highly anticipated events, which commonly triggered emotional responses from crew and bystanders.

"So it's that feeling in your gut. You don't want to have to deal with a really sick-to-dead kid. [...] So you're counting the minutes as you're driving with your foot flat to the floor, stressing about 'What size gear am I going to need?' You train for it, but you just don't do it as often. So it's just not as sold in your head. What are you going to do, how are we going to deal with it, it's a small person."

[Taylor, ICP, 7 years' experience]

In youthful arrests, resuscitation efforts were more-often initiated and sometimes continued for a longer time than might have been associated with cardiac arrest in a much older person. Even the most highly-experienced participants described a greater weight of responsibility and emotional response, associated with terminating resuscitation efforts in young people.

“I’ve been to people in their twenties that have gone into cardiac arrest and you’ve arrived and they’re in asystole and they’ve been down for some time. And that decision to say ‘They’re dead’ – and you’re looking at somebody who’s half your age. That’s really hard.”
[Morgan, ICP, 38 year’s experience]

3.3. Scene challenges

A number of factors external to the patient and prognosis appeared to complicate decision-making and the way decisions were actioned. Indeed, all participants described on-scene issues which impacted on decision-making. Participants were aware of bystander expectations and behaviours – and needed to adjust their actions and communication with each other, mindful that they had an audience. Many participants described frustration with the unrealistic expectations and perceptions of bystanders.

“And the AED just kept going ‘No shock advised, no shock advised.’ And by that point there were quite a few bystanders and his wife [...] started asking ‘Why aren’t you shocking him?’ Which I think is a really big issue with defibs and AEDs, is that the public doesn’t understand that it stops the heart, it doesn’t start it. And they feel that we’re not doing the right job when we’re not shocking them. Because they see it all on TV and [as if manually defibrillating] ‘Boom’ and magically alive, that sort of thing. So it’s difficult listening to that, especially while you’re doing it.”
[Bailey, FR, 2 years’ experience]

Many participants described commencing or continuing resuscitation primarily or exclusively to ensure crew safety. Highly-experienced Ash described multiple situations where a ‘show’ of resuscitation as made, until back-up arrived or it was otherwise safe to terminate efforts.

“... quite often there were times you just did a little bit longer and tried a little bit harder until police got there, or until you got out or something, because of your own safety. And just the cultural aspects of accepting that this person has died, when it wasn’t expected and all of that. And sometimes they can just get a bit – the anger – you can get caught up in that, as well, involuntarily. Not them being malicious, but just their expression that you should be doing more. So, yeah – sometimes you just keep going to show them that you’re doing some more, and knowing the patient’s dead. I’ve been in a few situations like that, where [as if whispering to a colleague] ‘Hey this guy’s dead but we’ll just keep going.’ Just to talk to them a bit more, wait until your backup comes or your manager comes or police come, just so you can explain things and your safety’s good.”
[Ash, ICP, 30 years’ experience]

3.4. Personal responses

The personal values and emotional responses of participants had a modulating influence on decision-making certainty and what constituted challenging or rewarding situations. Participants frequently referenced their personal and professional experiences with death, grief, disability, stress and distress. Death and tragedy were regarded as ‘part of the job’ but participants had divergent

beliefs about the impact of their emotions on decision-making and job performance.

And I’m having a little cry in this ambulance and I’m thinking ‘What the hell? This is not what I thought a cardiac arrest would be!’ And the Paramedic comes out and says ‘Hey, are you alright?’ And I say ‘Yeah.’ And then I’m embarrassed because I’m thinking [swears] how stupid, this is what you do. This is it. So I cleaned myself up, took a deep breath and went back in.”
[Jude, EMT, 3 years’ experience]

Hunter described the most pronounced emotional disengagement of all participants, and seemed to take pride in his objectivity, repeatedly describing himself as “cold-hearted” and “a numbers person.”

“I don’t have a big problem – in my head, the person’s dead, the person’s dead. And I’ll say ‘I’m sorry, your loved one has died.’ And I’m not sorry in the slightest [...] I don’t emotionally engage, generally. It’s not who I am. My role, as I see it in my head, is to bring calm and the right decision to the scene.”
[Hunter, ICP, 16 years’ experience]

In contrast, some participants considered acknowledgement of emotions as a feature of their expertise, and seemed to benefit from connecting with patients and families. Morgan rejected black and white thinking, favouring a considered, compassionate and holistic approach to decision-making.

“It’s not a simple decision of ‘I’m going to resus, yes or no.’ There are other considerations to take in. I think the big thing is that we must never forget that we’re human, and we cannot be so black and white about this sort of stuff.”
[Morgan, ICP, 38 years’ experience]

The role of emotions and sensitivity to patients and families was interconnected with participants’ own values, personal experiences and beliefs. Participants recognised that this provided a lens or locus for understanding situations, expressing a reluctance to resuscitate a patient who might then face a quality of life they would consider unacceptable for themselves, or someone they loved.

“I like to imagine if this was my partner or my Dad, or if this was me, what would I want? [...] What sort of things are going to happen to this patient that will make it worthwhile assisting them to that pathway?”
[Charlie, P, 6 years’ experience]

Differences in personal values meant participants didn’t always agree with the decisions of other ambulance personnel. Several of the more-experienced participants expressed frustration that colleagues had commenced or continued resuscitation efforts in situations where they felt that withholding or terminating resuscitation was appropriate.

“I’ve worked with some of my peers over the years that I haven’t been impressed at how they’ve dealt with some of these situations or what they’ve done, or I’ve seen people that have gone to the absolute excess of resus. To the point that it’s like [sternly, disapproving] ‘STOP, that person is DEAD!’”
[Morgan, ICP, 38 years’ experience]

4. Discussion

This study offers a provider-perspective on the challenges associated with prehospital decisions to commence, continue, withhold or terminate resuscitation. A lack of information or a mix of prognostic factors created decision-making “grey areas”. Ambulance

personnel are no strangers to uncertainty [17] and are trained to rapidly integrate data from patient assessment, history-taking and scene evaluation [18] with the patient as the usual focal point and source of information [19]. In cardiac arrest, the patient has no voice and this research supports other studies which show sourcing information from the scene and often-distressed bystanders can make decision-making more complex [20,21] and ethically challenging [22,23].

Exceptional cases, including first-encounters, secondary arrests or patients who were young were often described as challenging. These findings are congruent with other studies which have associated infrequently encountered presentations – including care of critically ill children – with higher levels of stress and uncertainty [24]. Clinical experience strengthens decision-making confidence and coping [17,21,25,26] but research shows paramedics have relatively little exposure to out of hospital cardiac arrest, and may have few opportunities for ongoing or advanced simulation training, once qualified [27].

Scene challenges identified by participants included bystander behaviour and expectations, logistical limitations and adverse environmental conditions. The need to deliver patient care in the field, with limited resources, is a defining feature of prehospital emergency care [28,29], but resuscitation skills are often taught and assessed in a well-lit, warm and quiet classroom, a manikin laid on the floor, with adequate surrounding space and resources. Participants in this study described battling hunger, fatigue and stretched resources in noisy, highly-emotional, cramped, dark, cold and chaotic scenes. A focus on well-rehearsed, rapid ‘pit-crew’ delivery of basic life support is fundamental to emergency ambulance training. However, a singular focus on life-saving skills may not prepare paramedics for the ethically and clinically complex reality of cardiac arrest scenes and the deaths which most commonly result [22,30–32].

The fourth, overarching theme of personal responses described the idiographic nature of the experience of the decision-maker. Each participant articulated personal emotional triggers, experiences, expertise and values. The role of emotions was a point of some divergence, with some participants acknowledging the place of emotional responding, whilst others sought to achieve emotional detachment. High levels of stress and emotional distress in resuscitation contexts have been associated with decreased performance [33], decreased job satisfaction and even PTSD symptoms, amongst prehospital providers [34,35]. Research suggests that professional and personal development and coping are facilitated by debriefing and other opportunities to share and reflect on challenging cardiac arrest decisions [24,36]. Awareness of emotions [37,38] personal values [22] and performance under stress [39] have also been associated with clinical decision-making confidence and coping.

4.1. Limitations

The participants in this study, whilst demographically diverse, all worked within a single organisational and national setting and results may not be transferable to other populations. The highly-experienced, volunteer sample may have captured ambulance personnel who provided particularly articulate decision-making rationales, and insightful expressions of personal values and ethical standards. This is arguably both a limitation and strength of the study design – notably, all participants conceded that they continued to face challenges when making resuscitation decisions.

5. Conclusion

Drawing on their collective experience of attending thousands of out-of-hospital cardiac arrests, participants in this study

described the clinical, ethical, cognitive and emotional demands of resuscitation decision-making. Uncertainty and challenge were associated with a number of features, including the patient, scene, arrest aetiology and available information. Awareness of personal values and emotional responses appeared to have a modulating effect.

Simulated training should move beyond resuscitation task performance, to incorporate challenging elements and encourage ambulance personnel to explore their personal values, stressors and coping strategies.

Conflict of interest

None to declare.

Ethical statement

This study was approved by the University of Auckland Human Ethics Committee (Reference #016147) and St John New Zealand.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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