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Clinical paper

Views and perceptions of advanced life support practitioners on initiating, withholding and terminating resuscitation in out-of-hospital cardiac arrest in the Emergency Medical Services of South Africa

S. Higgins^{a,*}, S. Dlamini^a, M. Hattingh^b, S. Rambharose^c, E. Theron^a, W. Stassen^a

Abstract

Introduction: This study aimed to explore the views and perceptions of Advanced Life Support (ALS) practitioners in two South African provinces on initiating, withholding, and terminating resuscitation in OHCA.

Methodology: Semi-structured one-on-one interviews were conducted with operational ALS practitioners working within the prehospital setting in the Western Cape and Free State provinces. Recorded interviews were transcribed and subjected to inductive-dominant, manifest content analysis. After familiarisation with the data, meaning units were condensed, codes were applied and collated into categories that were then assessed, reviewed, and refined repeatedly.

Results: A total of 18 ALS providers were interviewed. Five main categories were developed from the data analysis: 1) assessment of prognosis, 2) internal factors affecting decision-making, 3) external factors affecting decision-making, 4) system challenges, and 5) ideas for improvement. Factors influencing the assessment of prognosis were history, clinical presentation, and response to resuscitation. Internal factors affecting decision-making were driven by emotion and contemplation. External factors affecting decision-making included family, safety, and disposition. System challenges relating to bystander response and resources were identified. Ideas for improvement in training and support were brought forward.

Conclusion: Many factors influence OHCA decision-making in the Western Cape and Free State provinces, and numerous system challenges have been identified. The findings of this study can be used as a frame of reference for prehospital emergency care personnel and contribute to the development of context-specific guidelines.

Keywords: Out-of-Hospital Cardiac Arrest, South Africa, Cardiopulmonary Resuscitation, Clinical Decision-Making

Introduction

Cardiovascular disease (CVD), the predominant cause of out-of-hospital cardiac arrest (OHCA),¹ is on the rise in Africa, including South Africa.² Internationally, the prognosis and neurological outcomes associated with OHCA are poor, with survival rates of 8.8% (95% CI 8.2–9.4%) following discharge from hospital.³ Overall survival following OHCA in low-to-middle-income countries (LMIC) has been reported to be poor,^{4,5} but studies are limited.

Resuscitation rates for Emergency Medical Services (EMS) in the Western Cape are low.⁶ To explain this, it might be important to understand what influences EMS decision-making (See Fig. 1).

Delayed response times in South Africa^{6,7} are likely due to an inadequate number of ambulances.^{8–10} The longer the downtime before CPR is initiated, the less likely a successful resuscitation would be.¹¹ This highlights the importance of a rapid decision of whether or not to initiate CPR and the viability of resuscitation after a delayed response time.

* Corresponding author at: Division of Emergency Medicine, Faculty of Health Sciences, University of Cape Town, Groote Schuur Hospital, Main Rd Observatory, Cape Town 7925, South Africa.

E-mail address: sarahamyhiggins@icloud.com (S. Higgins).

<https://doi.org/10.1016/j.resplu.2024.100709>

Received 4 March 2024; Received in revised form 25 June 2024; Accepted 26 June 2024

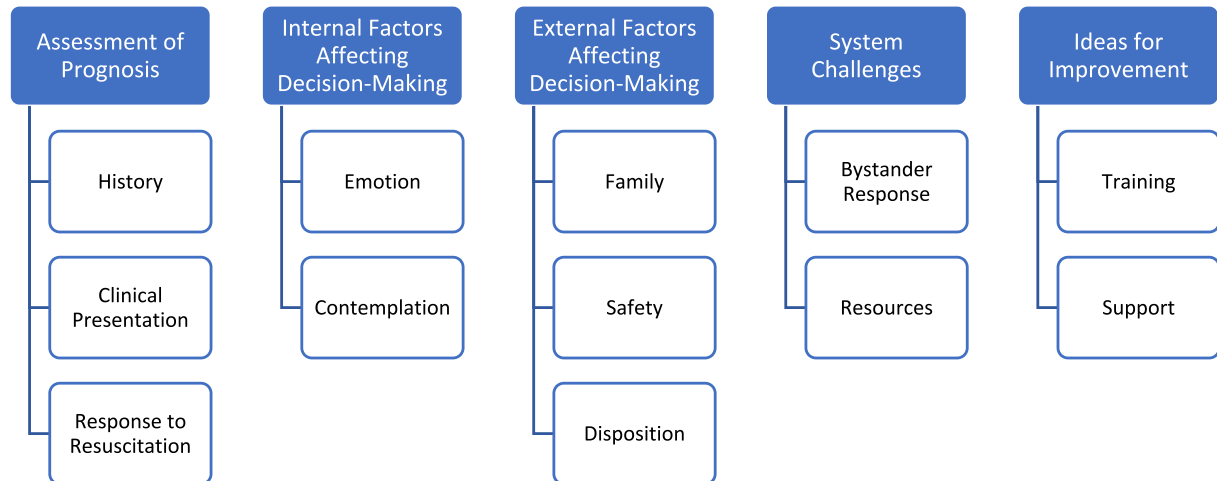


Fig. 1 – Main Categories and Subcategories.

The benefits of cardiopulmonary resuscitation (CPR) and other interventions are considerable,¹² but there is a natural end to life and modern techniques and interventions may, in some cases, prolong the lives of patients who have little chance of recovery. The quality of life following cardiac arrest and the subsequent interventions within a system that is not capable of adequate continuation of care questions whether the initiation and continuation of resuscitation are in the best interest of the patient, their family and the health-care system.

Despite international recommendations for using validated pre-hospital termination of resuscitation rules for adults,¹³ their implementation is not well established or documented in South Africa. Apart from obvious signs of death, there are no clear-cut guidelines for advanced life support (ALS) practitioners for when to initiate, withhold, continue or terminate CPR in the prehospital setting in South Africa. Practitioners are often required to make a rapid decision regarding resuscitation and therefore, this study aimed to explore the views and perceptions of ALS practitioners in two South African provinces on initiating, withholding, and terminating resuscitation in OHCA.

This could uncover ideas that may be expanded and further explored to contribute to developing a guideline for decision-making in OHCA for ALS practitioners in LMICs.

Methods

This study followed a qualitative descriptive design. Using semi-structured one-on-one interviews, this study explored the views and perceptions of ALS practitioners on initiating, withholding, and terminating resuscitation in OHCA in the EMS of the Western Cape and Free State provinces of South Africa.

Ethical approval was granted by the University of Cape Town's Human Research Ethics Committee (HREC 101/2021, Western Cape and HREC 583/2021, Free State).

Reflexivity

The primary researchers, SH and SD are both female Emergency Care Practitioners (ECPs). SH is currently working as a Critical Care Paramedic in Qatar but with previous experience working in the

Western Cape. Her qualifications include a Bachelor of Emergency Medical Care and a Master of Philosophy in Emergency Medicine. SD is currently working as an Emergency Medical Care Lecturer at the Central University of Technology in Bloemfontein, with operational experience in the Free State. MH is a female lecturer in Occupational Health Nursing and Health Services Management at the University of the Free State. She has a PhD in Health Professions Education. The senior author (WS) is a male ECP and associate professor of emergency medicine, who graduated in 2010. Notwithstanding clinical experience, WS primarily works with emergency care systems development.

Before study commencement, participants were sent an email to explain the reasons for doing the research and to set up the interviews. The researchers have all been involved in resuscitation and are, therefore, the same as the sample population. They believe that ALS practitioners base their decision-making on futility, as well as external pressures on the scene. They also believe that ALS practitioners in the Western Cape and Free State tend to resuscitate patients inappropriately.

Research paradigm

The study was conducted within the pragmatist paradigm. Pragmatism is a philosophical perspective that emphasises the nature of experience, focuses on the outcomes of action and examines shared beliefs. Pragmatism is a directive to find practical answers to or assist in addressing tangible issues. The researcher strives to gain practical understanding and wisdom to inform action.¹⁴ The intention is to illustrate the views and perceptions held by the participants regarding OHCA within the Western Cape and Free State provinces of South Africa.

Study setting

The participants included in this study were operational ALS practitioners working within the prehospital setting in the Western Cape and Free State, two provinces in South Africa that cover land masses of 129 462 km² and 129 825 km², and with estimated populations of 7.2 million and 2.9 million people respectively.¹⁵ The populations are distributed in rural and urban areas and are served by dual prehospital care systems where there are private and state ambulance services. South Africa is positioned uniquely. It has one of the most

advanced EMS on the African continent but faces similar resource constraints to other African contexts. Additionally, its private sector could in many ways be compared to HIC systems, but socially it functions within an LMIC health system.

Sampling

The study used convenience sampling to recruit the participants. A brief description of the study was sent to three groups on WhatsApp (Meta Platforms, California, United States of America) that have many ALS practitioners as members. Those who were interested in participating and met the inclusion criteria were invited to an interview via email. Informed consent documentation was shared for review and signing.

ALS practitioners with at least one year of operational experience and registration with the Health Professions Council of South Africa as either a Paramedic or Emergency Care Practitioner (ECP) were eligible to participate in the study. These practitioners represent the highest qualified prehospital providers in South Africa, equipped with a superior level of decision-making skills, and who are called upon to attend all OHCA resuscitation attempts. Both cadres of providers have autonomy in deciding when to initiate, withhold or terminate resuscitation. All other cadres of prehospital practitioners were excluded due to lower levels of autonomy. Practitioners without sufficient (<1 year) or recent patient-facing experience and those not currently practicing within the Western Cape or Free State provinces were also excluded. To incorporate a variety of perspectives, participants employed in both public and private sectors, and working in different settings (both rural and urban) were included.

Data collection instrument

A discussion schedule was used to guide the interviews. It was developed using published literature with similar research methods to inform the interview questions.^{16–19} Once drafted, the discussion schedule was piloted with participants in both provinces to confirm its suitability and to ensure consistency. Adjustments were made to the interview style and the discussion schedule based on the feedback provided from the pilot discussions. The data collected from the pilot discussions were included in the results as the pilot participants met the eligibility criteria of the study and the content of the discussion schedule did not change following feedback, only the approach to questioning.

Data collection

Semi-structured one-on-one interviews were conducted online via Microsoft Teams (Microsoft Corporation, Redmond, Washington, United States of America) by the primary researchers (SH and SD) and audio recorded using Voice Memos (Apple Inc., California, United States of America). SH was supported by WS during the first five interviews while SD was supported by MH. Interviews took place in April 2021 for the Western Cape and September 2021 for the Free State.

Interview questions and prompts were guided by the discussion schedule. Field notes were made during the interviews by the primary researchers and additional notes were made during the post-interview reflections between the authors. Earlier participants were contacted after the completion of their initial interview and asked to comment on specific results that had emerged from subsequent interviews, towards saturation. These participants provided their insights via WhatsApp (Meta Platforms, California, United States of

America) voice notes which were transcribed and included in the data analysis.

Data analysis

Data analysis was done by the primary researchers (SH and SD) using NVivo Software (QSR International, Doncaster, Australia). The audio-recorded interviews were transcribed and subjected to inductive-dominant, manifest content analysis.²⁰ After familiarisation with the data by repeatedly listening to audio recordings of interviews and reading interview transcripts, meaning units were identified from the text, and condensed. Codes that maintained the fundamental concept of the original meaning units were then formulated. These codes were collated into categories to the manifest level and assessed, reviewed, and refined repeatedly until saturation.²¹ Data analysis was first completed separately for each of the two provinces, and then combined. Codes and categories were continually refined through investigator triangulation with WS, MH, and ET. The coding tree (Table 1) illustrates the categorical development.

Results

A total of eighteen participants with varying backgrounds and with a mean of 9.8 years of experience (range 1–22 years, SD 5.9) were included in the study. Interview lengths ranged from 25 to 79 min (mean 43 min). Saturation was obtained after eight interviews for the Western Cape and six interviews for the Free State, with two further interviews being conducted for each province. Participant details are presented in Table 2.

After analysis, five main categories were developed from 29 codes. When asked what factors influenced their decision-making, participants said that it was multifactorial and based on patient- and situation-dependent factors. These factors were divided into five categories, being: 1) assessment of prognosis, 2) internal factors affecting decision-making, 3) external factors affecting decision-making, 4) system challenges, and 5) ideas for improvement. The results are summarised in Table 3 and participant quotes are included in Table 4.

Assessment of prognosis

Assessment of prognosis describes the clinical considerations used to assess the viability of the resuscitation. Factors including history, clinical presentation, and response to resuscitation contributed to assessing whether the prognosis might be positive or negative, influencing survivability or utility respectively.

History

The history obtained by the participants upon arrival on the scene consisted of age, medical history, and cause of arrest. Patient age was never mentioned in isolation but emerged as a strong influence on decision-making. There appears to be a link to emotion when it comes to younger patients, particularly children.

Decision-making was portrayed to be a lot more difficult in cases of paediatric patients. Participants also pronounced their willingness to start resuscitation, “go all out” and “give it a bit more” when it comes to children and described their cut-off time for the duration of resuscitation to be “almost non-existent.” **Participants P4 and P9.** There does not appear to be a specific age cut-off for resuscita-

Table 1 – Category Development.

Meaning Unit	Code	Category
“the downtime kind of points to the fact that resuscitation will be of no use”	No-Flow Time	Assessment of Prognosis
“there was nothing that could have been done but we still tried, because that’s what we do”	Duty to Act	Internal factors affecting decision-making
“I think it’s where we as practitioners start to think about what the knock-on effect will be on the system”	System Impact	External factors affecting decision-making
“whenever I feel that I’m not safe then I have got a right to stop and I do stop”	Hostile Environment	External factors affecting decision-making
“we don’t have public AEDs, we only have a select few in airports and gyms, but it’s not that common like we would like it to be”	Early Defibrillation	System Challenges
“guide on your approach, and a holistic approach and a technical approach to commencement and termination of CPR would be very valuable”	Decision-making Aid	Ideas for Improvement

Table 2 – Participant Details.

Participant	Qualification	Sector of Employment	Province	Experience
P1	ECP ¹	Public	Western Cape	15 years
P2	ECP	Private	Western Cape	2 years
P3	ECP	Private	Western Cape	10 years
P4	ECP	Public	Western Cape	3 years
P5	ECP	Private	Western Cape	1 year
P6	ECP	Private	Western Cape	2 years
P7	Paramedic	Public	Western Cape	17 years
P8	Paramedic	Public	Western Cape	18 years
P9	ECP	Public	Western Cape	8 years
P10	ECP	Private	Western Cape	4 years
P11	ECP	Public/Private	Free State	11 years
P12	Paramedic	Public/Private	Free State	11 years
P13	Paramedic	Private	Free State	12 years
P14	Paramedic	Public/Private	Free State	12 years
P15	Paramedic	Public/Private	Free State	12 years
P16	ECP	Public/Private	Free State	11 years
P17	ECP	Public/Private	Free State	22 years
P18	Paramedic	Private	Free State	5 years

¹ Emergency Care Practitioner.

tion in paediatric or elderly patients, but older age was linked to poor prognosis. Advanced age was also a perceived link to little chance of returning to baseline after resuscitation. Although not as obvious as the link with children, emotion also seemed to influence decision-making in the resuscitation of elderly patients. Upholding patient dignity was more important than the act of CPR in elderly patients.

Often combined with patient age, medical history was another factor that determined prognosis. Participants mostly referred to baseline and quality of life, general appearance (emaciated or obese), and the presence of terminal illness as influencers of their decision-making.

The cause of arrest is the presumed reason that the patient went into cardiac arrest.²² When speaking about the cause of arrest affecting prognosis, participants gave examples that would sway their decision such as terminal illness, reversible and irreversible causes of cardiac arrest. The irreversible causes mainly referred to trauma which was described as unlikely to result in a successful resuscitation.

Clinical presentation

The first monitored rhythm, no-flow time, and duration of resuscitation determined the clinical presentation. The first monitored rhythm is the patient’s cardiac rhythm when the monitor is first attached following a cardiac arrest.²² An initial rhythm of asystole, when combined with other factors, was a reported reason to withhold CPR. Asystole was also described as an indicator of prolonged no-flow time, which is another factor that influenced participants’ perception of prognosis.

While the decision to initiate CPR in patients presenting with a shockable first monitored rhythm was unanimous, participants found the decision to be more difficult when the patients present with pulseless electrical activity (PEA). The cardiac rhythm was also a factor that influenced the decision to terminate resuscitation with a participant stating that they “*will stop when the rhythm progresses to asystole.*” **Participant P12.**

The duration of no-flow time is measured as the time a patient collapses to the time of initiation of CPR.¹¹ Components of no-flow

Table 3 – Main Categories, Sub-categories and Codes.

Category	Sub-category	Code
Assessment of Prognosis	History	Age
		Medical History
	Clinical Presentation	Cause of Arrest
		First Monitored Rhythm
		No-Flow Time
	Response to Resuscitation	Duration of Resuscitation
		ECG Rhythm Changes
ETCO ₂ Changes		
Internal Factors Affecting Decision-Making	Emotion	ROSC
		Duty to Act
		Fear of Litigation
	Contemplation	Empathy
		Buying Time to Make the Decision
		Consequence of Actions
External Factors Affecting Decision-Making	Family	Family Wishes
		Financial Implication on Family
	Safety	Hostile Environment
		Safety During Transport
	Disposition	Availability of Resources at Receiving Hospital
System Challenges	Bystander Response	System Impact
		Early Defibrillation
	Resources	Bystander CPR
		Prehospital Resources
		Limited Hospital Resources
Ideas for Improvement	Training	Inequality
		Decision-Making Aid for EMS
	Support	Public CPR Training
		Emotional Support for EMS
		Debrief

time that affected decision-making were the location of the incident and the resultant response time. The incidence and quality of bystander CPR were also components of no-flow time that affected decision-making.

The presence or absence of ongoing CPR on arrival not only affected the initiation or withholding of CPR respectively but also affected the duration of the resuscitation thereafter. Duration of resuscitation describes the length of time the resuscitation has been ongoing and its effect on prognosis.²³ While there was no consensus on a specific timeframe after which resuscitation becomes futile, prolonged resuscitation efforts were described as “*doing more harm than good.*” **Participant P10.** A relationship between the duration of resuscitation and the response to resuscitation was also described.

Response to resuscitation

The response to resuscitation was determined by ETCO₂ and ECG rhythm changes or Return of Spontaneous Circulation (ROSC). ETCO₂ and its measurement of the response to resuscitation also affected the duration of resuscitation. For practitioners to continue resuscitation, they need to see a meaningful change in response to their resuscitation efforts.

Internal factors affecting decision-making

Internal factors affecting decision-making describe the participants' inherent values and viewpoints that affect their decisions in resuscitation. These factors were divided into those that were driven by emotion and those of contemplation.

Emotion

The emotions affecting decision-making were duty to act, empathy, and fear of litigation. Duty to act describes the participants' desire to save lives motivating their decision to resuscitate. Participants described wanting to do the most for the patient and doing everything they can. One participant also described the failure point of paramedics being when the patient dies. Empathy manifested from seeing the family's emotional response.

Fear of litigation describes the tendency to initiate or continue resuscitation due to their fear of not being able to justify their decisions. Fear of legal consequences also emerged as an internal factor affecting decision-making.

Contemplation

Buying time to contemplate the consequences of their decision was an internal factor affecting decision-making. It describes the initiation and continuation of resuscitation as a means to buy time to find out more information before making a decision to terminate or continue. This initiation of resuscitation for the purpose of obtaining information was also explained as being only at the BLS level.

In addition to the legal consequences, participants also considered the outcome of their decision-making on the patient, their family, and the system.

External factors affecting decision-making

External factors describe the components of decision-making that are not related to the patient or the practitioner, but that may be

Table 4 – Participant Quotes.

Participant	Quote
Assessment of Prognosis: History	
P10	<i>“There’s a lot more of an emotional aspect to why we don’t stop in the younger population when they go into cardiac arrest.”</i>
P15	<i>“There is a bit of an emotional hijacking that happens because. . . it’s a child and you need to do something.”</i>
P15	<i>“With children, you always assume that they have a better chance of surviving compared to adults.”</i>
P10	<i>“Prognosis is a lot poorer in someone who is older.”</i>
P13	<i>“What age category am I looking at? . . . I might have a poor prognosis.”</i>
P9	<i>“The relatively old and frail. . . the chances of them going back to the way they were is not that great.”</i>
P3	<i>“Rather than crushing this old lady’s chest just because you need to now do CPR and then rather giving her a dignified death or last couple of moments with the family.”</i>
P6	<i>“Higher likelihood of resuscitating a patient that has less pathologies.”</i>
P10	<i>“Generally if they’ve gone into a traumatic cardiac arrest, the likelihood of getting them back is very slim”</i>
P11	<i>“This patient is not going to make it. . . massive traumatic incident.”</i>
Assessment of Prognosis: Clinical Presentation	
P2	<i>“If the patient is asystole when you arrive, we’re not going to be starting.”</i>
P3	<i>“That usually points towards more of a prolonged downtime in cardiac arrest than anything else.”</i>
P3	<i>“With PEA specifically I think it’s a bit of a difficult one to just make a decision.”</i>
P15	<i>“The first thing would be to discover how long the patient has been down for.”</i>
P10	<i>“If you respond to areas that are 50, 60 km away for a cardiac arrest. . . you start asking questions about resuscitation and whether it’s viable.”</i>
P8	<i>“Whether there was bystander CPR that was of good quality.”</i>
P8	<i>“If there was [CPR], I’d be inclined to go on a bit longer, if there wasn’t, I’d be inclined to not go on longer.”</i>
P7	<i>“It’s the relationship between how long we have been going and what the patient has given back to us.”</i>
Assessment of Prognosis: Response to Resuscitation	
P5	<i>“ETCO₂ can guide whether or not you will have a better possibility for ROSC and a better recovery rate.”</i>
P10	<i>“Generally, if the patient never goes into any kind of other rhythm, that’s another factor that I would consider.”</i>
P7	<i>“If someone has got higher ETCO₂ levels, then ja, let’s give it a bash, give it a longer bash.”</i>
P12	<i>“If I don’t see any changes then I would stop.”</i>
Internal factors affecting decision-making: Emotion	
P1	<i>“You always have this inclination to do the most.”</i>
P12	<i>“I feel better after actually doing my best, even if the patient does not respond.”</i>
P8	<i>“Our failure point, our end of game is when they die.”</i>
P18	<i>“Sometimes you get emotional. . . depending on the family’s reaction.”</i>
P10	<i>“You have to think about these things in order to justify why you are terminating.”</i>
P3	<i>“If you have a slow bradycardia type of PEA or agonal type of PEA, like I said, medicolegally it’s not really allowed to just terminate”</i>
Internal factors affecting decision-making: Contemplation	
P8	<i>“I generally get the engine running while I’m digging into the clinical picture, baseline, family wishes.”</i>
P9	<i>“I would generally go on with the resuscitation, but not to the full extent of advanced life support.”</i>
P9	<i>“There’s normally some sort of deficit which wasn’t there prior to the cardiac arrest. . . I do think of the burden that you [the patient] might be on the family.”</i>
P4	<i>“You could get ROSC on that patient and intubate, put them on a ventilator, take them to hospital, but who are you depriving for that patient to be there?”</i>
External factors affecting decision-making: Family	
P5	<i>“There was this expectation that there was more for us to do.”</i>
P11	<i>“Try to explain and they say no please do whatever you can.”</i>
P8	<i>“Usually the family are so tired, suffering from so much acopia from tending to their loved one, that they will say I think it’s okay, let them go.”</i>
P7	<i>“Will it push me to make an extra 2-minute round of CPR? Ja, fair enough, it’s not going to cost me anything, if that’s what they desire.”</i>
P10	<i>“They can see that we are doing everything we can.”</i>
P2	<i>“You can help them find closure.”</i>
P9	<i>“There’s normally some sort of deficit which wasn’t there prior to the cardiac arrest. I do think of the financial burden, or the burden that you might be on the family.”</i>
P5	<i>“It was a low-income family and they also mentioned that the cost on the family itself for therapy is ridiculous. It burdens the family.”</i>
P13	<i>“This is the only person that we were depending on to put food on the table.”</i>
External factors affecting decision-making: Safety	
P7	<i>“I think for us especially in the provincial sector for example hazards is a big thing which can lead to the decision not to start or to terminate.”</i>
P5	<i>“When it started to look like we weren’t going to resuscitate, they [the family] became very, very aggressive towards us, so it was actually a safer option to resuscitate.”</i>
P12	<i>“In assault cases or mob justice, the community becomes very hostile especially when you try to resuscitate someone that’s a criminal.”</i>

Table 4 (continued)

Participant	Quote
P10	"Will I get a police escort, even though I know that it is going to delay my time at the scene?"
P3	"Performing resuscitation en route, this is not really safe."
External factors affecting decision-making: Disposition	
P3	"Where we're going will the patient be able to get a ventilator, if the patient is resuscitated successfully, will we have the availability of cardiac support?"
P9	"Is the hospital that needs to give you the definitive care kind of close by? Can I get you there within a relatively safe period?"
P1	"If you look at the systems that need to be in place... chain of survival that needs to occur throughout the entire healthcare system... that becomes a very, very big expenditure on our healthcare GDP."
P9	"I think it's where we as practitioners start to think on what the knock-on effect is going to be on the system."
System Challenges: Bystander Response	
P9	"Because we don't have public AEDs – we only have a select few in airports and gyms – but it's not as common like we would like it to be."
P8	"I think it's criminal that there aren't AEDs on every single ambulance."
P2	"I think there are a lot of people that don't even start bystander CPR."
P3	"Education-wise there's almost nothing... so obviously the cost would be significant."
P6	"I just don't know if we actually have the correct setting for it to be properly administered."
System Challenges: Resources	
P2	"Our dispatcher or our call-takers don't do like that on call how to perform CPR with a patient."
P4	"... call-taker headed CPR and that kind of stuff, I don't know if that's working."
P9	"We don't have any scripted call-taking."
P14	"The problem is the control centre sending the wrong resources to the wrong cases."
P1	"I think we're pretty well-resourced prehospitally in the Western Cape, Cape Town Central."
P4	"At the moment, in the Western Cape we are actually pretty well sorted with the things that we need."
P2	"Prehospitally at the moment we are lacking in resources."
P9	"We have an imbalance between the number of calls pending on our board versus available resources."
P2	"Usually, the response radius for ALS is quite far, being quite a scarce resource."
P4	"... goes to a clinic where they have no infusion pumps, no ventilator..."
P2	"They won't have the capability to actually manage the patient further."
P4	"The decision is always how many beds are available in the ICU."
P2	"There is resuscitation space or areas set up for those patients, that in fact will be occupied by someone that technically does not earn them..."
P11	"We are not adequately equipped... even the human resources."
P14	"We've got limited resources and we've got limited manpower."
P15	"The hospital is not ready for you, or they don't have beds, or there are no doctors who can take the patient over."
P1	"Access to those PCI facilities becomes limited if you do not have medical insurance."
P18	"Working for the private company, we had a lot of assistance from the private hospitals."
P1	"That's not even equally distributed in terms of our population burden, or our population density... even in the metropole those resources aren't distributed fairly or equally."
Ideas for Improvement: Training	
P10	"You get taught how to do an ALS resuscitation, but you don't get taught when to do an ALS resuscitation, or when to terminate."
P1	"I just feel that we don't necessarily have clear guidelines on when, how, where."
P16	"I don't think we have a protocol in place as such."
P9	"There were no real clear guidelines to say these patients get CPR, these don't get CPR."
P8	"... as a starting point for new practitioners, absolutely the guide on your approach, and a holistic approach, and a technical approach to commencement in termination of CPR would be very valuable."
P9	"... it has to be contextual within the specific geographical area that you work in."
P3	"I think we can do quite a lot more with regards to the first responder bystander CPR."
P3	"I think if we can implement something at school level..."
P10	"The first responders who go out to all of these calls... CPR is generally started a lot sooner than if they weren't there."
Ideas for Improvement: Support	
P10	"I've just been like very upset and despondent afterwards because I had to make a decision to terminate."
P9	"He's going to tell me but why do you allow it to affect you, you should man up."
P9	"Even though everywhere there are... health and wellness and our care pneumonic and we care about our people and it kind of ends there. It ends on the nice poster."
P15	"They only notice that you have a problem if you start drinking a lot."
P11	"Most of us resort to all sorts of funny coping mechanisms that are not so healthy... excessive alcohol consumption."
P9	For the daily occurrence of those kind of calls we should have an in-service... team which focuses on these kinds of things.
P9	"... it helps a lot for team cohesion and team development."
P10	"Part of the debrief was: is everyone okay? Is there anything that you want to get off your chest. We know it was a difficult case."
P13	"That is something I found helping me, just to break out and then speak to people."

encountered on a scene and influence the decisions made. These factors include family, safety, and disposition.

Family

Family wishes, as well as the financial implication of the resuscitation on the family were considered. Family wishes describes the verbal or non-verbal communication with the patient's family members to ascertain what it is that they want from the resuscitation. Certain cues from family members indicated that the family were ready to let their family member go.

There are also occasions in which family members cause the resuscitation to continue beyond the point that it would have been terminated. Allowing family members to be present during resuscitation and to see the ongoing efforts by EMS was endorsed by participants as a good way of providing closure.

The financial implication on the family was a factor considered by participants as the potential financial burden that a survivor of cardiac arrest may place on their family during recovery or once they have returned home with additional care requirements. This financial strain is exacerbated by the patient being the breadwinner of the family.

Safety

Safety described not only the factors that influenced the decision not to start resuscitation due to the scene not being deemed safe enough to approach the patient but also the factors that influenced the decision to initiate or continue resuscitation due to interpersonal threats.

Safety was also linked to a delay in reaching the patient due to the need to wait for a police escort. Aside from tactical threats, the danger of ongoing resuscitation in the back of an ambulance during transport to hospital was mentioned.

Disposition

Disposition describes the participants' consideration of the facility to which the patient should be transported, its capability to continue care and its distance from the scene. The location of the cardiac arrest brought about questions as to whether the patient would survive the journey to the receiving facility where definitive care could be delivered.

Also considered as a component of patient disposition, system impact was described as the overall impact on the healthcare system that OHCA decision-making may have. Participants considered their setting when speaking about the impact their individual decisions may make on the system. Individual decision-making was described as having a knock-on effect on the system.

System challenges

System challenges is a category that emerged while participants were describing the factors that influence their decision-making. It describes some of the obstacles encountered and how they contribute to the futility of prehospital resuscitation in the Western Cape. These obstacles are subdivided into components of bystander response and resources.

Bystander response

Early defibrillation was said to be one of the challenges within the Western Cape. Apart from the unavailability of public-access AEDs and the resultant barrier to early defibrillation, one participant

expressed their concern over the absence of defibrillators on some ambulances. Lack of bystander response was highlighted as a challenge within the EMS system in the Western Cape. The reason was said to be the lack of public education, but its suitability was questioned.

Resources

There were many challenges relating to EMS dispatch that were identified. Linked to the lack of bystander CPR, one participant claimed that call-takers and staff in the call centre do not coach CPR. Another participant expressed concern over its efficacy. Obtaining incorrect or incomplete call details and resultant inappropriate resource allocation is also occurring because scripted call-taking is not utilised in the Western Cape EMS call centre.

There were conflicting opinions on the resources available prehospitally in the Western Cape. Some participants described the Western Cape EMS as well-resourced in the urban areas. Other participants felt that there was a lack of resources prehospitally in the Western Cape. It seemed to be unanimous that there is a shortage of ALS practitioners in the Western Cape.

In-hospital resources were more of a concern than prehospital resources in the Western Cape. Community Healthcare Centres, decentralised primary healthcare facilities located around the province, were described as not being fully equipped and incapable of managing ROSC patients appropriately. The main concern with tertiary hospitals was the availability of ICU beds and the improper allocation of hospital beds. In the Free State, human resources and equipment were described as inadequate both prehospitally and within hospitals.

Inequality was another system challenge that was identified. Disparities in access to care exist between members of the population that have medical insurance and those who do not. In addition to medical insurance, patient location also affects patient access to EMS. The distribution of ALS practitioners and resources was described as unequal and unfair.

Ideas for improvement

While identifying system challenges, participants also brought forward ideas for system improvement. These ideas included improvements in training for both EMS and bystanders, as well as emotional support and debrief for EMS following a cardiac arrest case.

Training

While most participants found their theoretical and practical resuscitation training to be adequate, training on OHCA decision-making was said to be inadequate. There was also a notable concern over the lack of an OHCA decision-making guideline. Participants expressed the need for improved training and a contextually appropriate guideline to assist with decision-making.

Good-quality bystander CPR and early defibrillation were factors that influenced decision-making in OHCA. Improving bystander CPR was one of the ideas brought forward. Suggestions were made to implement CPR training at the school level. One of the participants drew a connection between the presence of a volunteer community first responder organisation and earlier initiation of CPR from their experience.

Support

Emotion was evident at various points in every interview. Not only does emotion affect decision-making, but its effect and how it is dealt with was also identified as a challenge within the EMS community. It is clear that certain resuscitation cases have an emotional effect on practitioners. There appears to be a stigma associated with expressing emotion following a cardiac arrest.

Emotional support for EMS staff following a difficult resuscitation case was described as lacking or only initiated once coping mechanisms have become unhealthy. A suggestion was made to establish a team dedicated to regular emotional support. Debriefing was identified as an important component of a cardiac arrest case and as an opportunity to offer and receive emotional support from colleagues.

Discussion

The aim of this study was to explore the views and perceptions of ALS practitioners on initiating, withholding, and terminating resuscitation in OHCA in the Emergency Medical Services of the Western Cape and Free State provinces. Factors affecting decision-making were often described as multifactorial and based on patient- and situation-dependent factors. These factors included history, clinical presentation, response to resuscitation, emotion, contemplation, family, safety, and disposition. System challenges relating to bystander response and resources were identified and ideas for improvement in training and support were brought forward.

The multifactorial nature of the findings is in line with those of the exploratory study by Brandling et al. that factors presenting at each phase of the decision-making process resulted in variability of practice amongst prehospital practitioners in the UK.¹⁶ This variability is also consistent with the emotion that was found to affect the decision-making of our participants.

Clinical considerations such as age, medical history, cause of arrest, first-monitored rhythm, no-flow time, duration of resuscitation, and response to resuscitation were used to assess prognosis. Brandling et al. also found ECG rhythm, co-morbidities (medical history), and patient age to influence practitioner decision-making in OHCA in the UK.¹⁶ Anderson et al. found factors relating to the chain of survival (no-flow time, bystander CPR, shockable presenting rhythm, and quality of life (patient age, disability, co-morbidities)) to affect OHCA decision-making in New Zealand.¹⁷ These findings are all in line with evidence that the most important predictors of survival in OHCA are the first monitored cardiac rhythm, patient age, and no-flow time.²⁴

No-flow time, as a factor of prognosis that influenced practitioner decision-making in OHCA, was consistent with evidence that a “no-flow” time >12 min (95% CI 11–13 min) and a “low flow” time >33 min (CI 29–45 min) was associated with a 30-day survival of less than 1%.²⁵ An extended no-flow time could be attributable to delayed response times in Cape Town,⁶ lack of telephonic CPR guidance by EMS call-takers,²⁶ and identified barriers to bystander CPR.²⁷ Each of these components was identified by the participants as a system challenge.

Getting resuscitation underway (taking over and administering interventions before gathering further information), was a finding from the Anderson et al. paper¹⁷ that was consistent with our code “buying time to make decision”. Participants often initiated resuscitation to buy time to make a decision because they accept that there is

a strong responsibility of the decision that could have a legal consequence. This fear of consequence explains the decision. This finding is similar to that of the Brandling et al. paper which found “fear of litigation” to be one of the personal values and beliefs that influenced practitioner decision-making.¹⁶

In addition to legal consequence, participants considered the greater consequence of their decision-making on the healthcare system. For many, the decision to resuscitate was not made in isolation or based on the individual patient, but with consideration of the impact that resuscitating a patient with a poor prognosis may have on the system. Patient disposition (availability of hospital beds and continuation of care), financial implication on the family, the patient’s quality of life after resuscitation and their dignity, as well as the system impact (cost of continuation of care and bed availability), were all considered by participants. These considerations are in line with evidence that there are insufficient percutaneous coronary intervention facilities in the Western Cape and Free State,²⁸ as well as a national shortage of ICU beds²⁹ for post-ROSC care. These findings are unique, as most prehospital practitioners would not have to worry about them and none of the literature from HICs included these factors in their findings.

The external factors affecting decision-making were family wishes and safety. This is consistent with the findings of the Brandling et al. paper that interpersonal factors, such as influence from bystanders or family, as well as risk factors, such as safety influenced OHCA decision-making in the UK.¹⁶ Anderson et al. also found family wishes to be a factor affecting decision-making in New Zealand.¹⁷ Each of these factors are related to emotion.

Threats to safety, as well as family wishes could stimulate a decision driven by fear.¹⁷ Participants described situations in which they felt threatened by family members, resulting in an obligation to initiate or continue resuscitation. Fear of legal consequence is also linked to family wishes, as practitioners are fearful of terminating resuscitation when the family is not in agreement. However, participants also described the presence of family members during resuscitation to result in better acceptance of termination, which is in line with evidence that inviting family members to be present during resuscitation has been shown to improve their understanding of the patient’s condition and provide closure.³⁰ Safety was also linked to no-flow time and emotion, as participants explained their guilt for delaying response time by having to wait for a police escort to enter certain areas. This finding is also unique and differs from those in HIC.

The internal factors that affect decision-making were predominantly based on emotion. Similar to the finding of the Anderson et al. paper of “doing everything” (ensuring that everything that could be done was done, nothing missed, provides peace of mind),¹⁷ the code “duty to act” described the participants’ emotion of wanting to save lives motivating their decision to resuscitate. The emotion and the identity of a paramedic are seated in wanting to save patients, but there is a sense of conflict in the emotion between the need to save and the ability to save.³¹

To improve outcomes following OHCA, each component of the chain of survival must be developed,¹² but the financial expense of bolstering OHCA resuscitation efforts in a low-resource setting like South Africa⁶ might not be justified. There is a need for the development of evidence-based, context-specific policies and guidelines relating to OHCA and resuscitation in South Africa that are acceptable to the communities, policy-makers and healthcare workers.

Resources should be allocated towards addressing the local burden of disease and contextually appropriate interventions to improve outcomes.^{6,32}

Limitations

This study has some important limitations. A convenience method, which is vulnerable to self-selection bias, was used to obtain the sample. Consequently, those participants who agreed to take part in the research may differ from those who did not agree to partake in the study in ways that could have had an impact on the results. One obvious example is that the study sample consisted mostly of men and it is unknown if there are gender differences in terms of views and preferences for initiating, withholding and terminating resuscitation.

Both the primary researchers are the same as the sample population and have pre-existing views on the topic which could have led to observer bias. To minimise this, reflexivity was established early and maintained throughout the research process by omitting leading questions, repeating what was heard for clarity, and through researcher triangulation and peer debriefing. While this might be a limitation, it may also be considered a strength of the study as this might allow for enhanced trust and rapport which promotes honesty; and an insider perspective which allows for understanding of more nuanced meaning and context in the analysis.

Conclusion

This study explored the views and perceptions of ALS practitioners on initiating, withholding, and terminating resuscitation in OHCA in the emergency medical services of the Western Cape and Free State provinces of South Africa. We found that paramedic decision-making in OHCA was multifactorial and related to both patient and system factors. Some suggestions were made on how to improve this. We suggest that the findings be used to guide OHCA decision-making in South Africa and similar contexts.

CRedit authorship contribution statement

S. Higgins: Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **S. Dlamini:** Writing – original draft, Investigation, Formal analysis. **M. Hattingh:** Writing – review & editing, Supervision. **S. Rambharose:** Writing – review & editing, Supervision. **E. Theron:** Writing – review & editing, Supervision. **W. Stassen:** Writing – review & editing, Validation, Supervision, Project administration, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1. Qualitative Rigour

To create a trustworthy qualitative study, the Guba framework was used as a guideline to enhance credibility, transferability, dependability and conformability.³³ Credibility was improved by using established methods,³⁴ basing the line of interview questioning and data analysis methods off those that were used in previous similar studies,^{16–17} through voluntary enrolment of participants that met the defined criteria for inclusion, and by piloting the interview schedule before initiation of interviews. Transferability was improved by providing an in-depth description of the study context so that readers may apply findings that are relatable to their context.³⁴ Established methods were used to improve dependability of the study through detailed reporting of the study design and provision of a coding tree, enabling future researchers to repeat the study. To improve confirmability, the primary researchers' pre-dispositions were admitted and the research supervisors acted as secondary data analysers to reduce bias.³⁴

Author details

^aDivision of Emergency Medicine, University of Cape Town, Cape Town, South Africa ^bSchool of Nursing, University of the Free State, Bloemfontein, South Africa ^cDepartment of Physiological Sciences, Stellenbosch University, Stellenbosch, South Africa

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