

“Please. Don’t. Die.”

A Grounded Theory Study of Bystander Cardiopulmonary Resuscitation

See Editorial by Dukes and Girotra

Justin Mausz, MSc
Paul Snobelen
Walter Tavares, PhD

BACKGROUND: Bystander cardiopulmonary resuscitation (CPR) is an important determinant of survival from out-of-hospital cardiac arrest (OHCA), yet rates of bystander CPR are highly variable. In an effort to promote bystander CPR, the procedure has been streamlined, and ultrashort teaching modalities have been introduced. CPR has been increasingly reconceptualized as simple, safe, and easy to perform; however, current methods of CPR instruction may not adequately prepare lay rescuers for the various logistical, conceptual, and emotional challenges of resuscitating a victim of cardiac arrest.

METHODS AND RESULTS: We adopted a constructivist grounded theory methodology to qualitatively explore bystander CPR and invited lay rescuers who had recently (ie, within 1 week) intervened in an OHCA to participate in semistructured interviews and focus groups. We used constant comparative analysis until theoretical saturation to derive a midrange explanatory theory of bystander CPR. We constructed a 3-stage theoretical model describing a common experiential process for lay rescuer intervention in OHCA: Being called to act is disturbing, causing panic, shock, and disbelief that must ultimately be overcome. Taking action to save the victim is complicated by several misconceptions about cardiac arrest, where victims are mistakenly believed to be choking, and agonal respirations are misinterpreted to mean the victim is alive. Making sense of the experience is challenging, at least in the short term, where lay rescuers have to contend with self-doubt, unanswered questions, and uncomfortable emotional reactions to a traumatic event.

CONCLUSIONS: Our study suggests that current CPR training programs may not adequately prepare lay rescuers for the reality of an OHCA and identifies several key knowledge gaps that should be addressed. The long-term psychological consequences of bystander intervention in OHCA remain poorly understood and warrant further study.

Correspondence to: Justin Mausz, MSc, The Wilson Centre, 200 Elizabeth St, Room 1ES-565, Toronto, Ontario, Canada, M5G 2C4. E-mail mauszje@mcmaster.ca

Key Words: cardiopulmonary resuscitation ■ education ■ out-of-hospital cardiac arrest ■ qualitative research ■ shock

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WHAT IS KNOWN

- Survival from sudden, out-of-hospital cardiac arrest depends critically on the ability of bystanders to begin high-quality cardiopulmonary resuscitation.
- In an effort to promote cardiopulmonary resuscitation by bystanders, the procedure has been streamlined (ie, by removing pulse checks and artificial breathing), and novel training methods have been introduced, including short instructional videos and community outreach events.
- However, resuscitation is also emotional and how adequately the current training prepares lay rescuers for the reality of an actual resuscitation is unknown.

WHAT THE STUDY ADDS

- Lay rescuers face many challenges in attempting to resuscitate a victim of sudden cardiac arrest, including panic, shock, and disbelief.
- Common signs of cardiac arrest (eg, cyanosis, agonal respirations, and convulsions) are often misinterpreted to mean the victim is choking, or not in cardiac arrest.
- In the short term, lay rescuers have to contend with distressing emotional responses to a potentially traumatic event, and the long-term psychological consequences of the experience remain poorly understood.

Bystander cardiopulmonary resuscitation (CPR) by lay rescuers has been shown to be an important determinant of survival from out-of-hospital cardiac arrest,¹⁻³ yet bystander CPR rates remain highly variable.³ In an effort to promote bystander CPR, significant effort has been invested in making CPR training more accessible in the community. For example, pulse checks are no longer recommended, and the role of mouth-to-mouth artificial respiration has been deemphasized.⁴ Widespread public education campaigns now advocate for lay rescuers to initiate CPR in an unconscious victim who is not breathing or is not breathing normally.⁴ In addition to formal CPR courses, efforts to disseminate this hands-only CPR strategy have included a variety of nontraditional teaching formats such as community and workplace demonstrations and social media advertising.⁵⁻⁸ Collectively, these public awareness efforts have attempted to conceptualize hands-only CPR as important, safe, and easy to perform. Although increasingly accessible training for lay rescuers is desirable, it is possible such initiatives ultimately leave bystanders ill prepared to respond to the challenges of resuscitating a victim of cardiac arrest. As-yet unidentified contextual factors may make performing CPR logistically, physically, and emotionally demanding and may not be adequately addressed in current CPR training programs. Providing CPR may also be a psychologically

distressing and traumatic experience, and although previous research has suggested that long-term psychological sequelae are rare,⁹⁻¹² these studies have important methodological limitations including selection bias and highly variable follow-up intervals. If psychological trauma does exist, even if only in the short term, this may negatively affect participation in future resuscitations. Therefore, our goals in the present study were to qualitatively explore bystander CPR to identify contextual influences on performance that might be relevant for CPR training and to describe the emotional and psychological impact of providing CPR. Our research question broadly asked: What is the experience of bystanders who have attempted to resuscitate the victim of a sudden, out-of-hospital cardiac arrest?

METHODS

The data, analytic methods, and study materials will not be made available to other researchers for the purposes of reproducing the results or replicating the procedure. However, our methods are described in detail, and our interview guide is included in the article. We invite other researchers to evaluate our model in their specific contexts and to contribute to the evolving understanding of the experiences of bystanders who have attempted to resuscitate a victim of cardiac arrest.

Overview

We undertook an exploratory qualitative study of bystander intervention in sudden cardiac arrest. We defined a bystander as an individual who discovered a victim of cardiac arrest and witnessed their collapse and attempted to intervene by calling 911, performing CPR, and using an automated external defibrillator (AED). Hereafter, we use the term lay rescuer to describe bystanders to maintain consistency with the 2015 American Heart Association guidelines for basic life support.⁴ We adopted constructivist grounded theory as our methodology. Situated within a constructivist epistemology, grounded theory as described by Charmaz is underpinned by 4 key principles: (1) attending to the influence of context on the phenomenon; (2) understanding individuals, situations, and actions within their specific contexts; (3) viewing the subjective perspectives of individuals as sources of data to understand social experiences; and (4) acknowledging the role of the researcher on the construction of knowledge.¹³⁻¹⁵ Grounded theory's strength lies in the methodology's ability to iteratively develop an explanatory theory about a phenomenon through rigorous, interpretive analysis.¹⁴ We followed the Standards for Reporting Qualitative Research framework by O'Brien et al¹⁶ in conducting and reporting this study.

This study was unfunded and was approved by the Centennial College (Toronto, Ontario) Research Ethics Board. All participants provided informed written consent to participate.

Setting

Our study was situated in Ontario, Canada. Peel Regional Paramedic Services (PRPS) is a publicly funded lower tier

municipal emergency medical service responsible for providing ambulance and paramedic services to 1.2 million residents across a geographic region of 1247 km². PRPS responds to ≈112 000 emergency calls annually, including ≈1200 cardiac arrests. Unpublished data from PRPS indicates that resuscitation is typically attempted in half of these cases, and the majority of cardiac arrests in the region (>75%) occur in private home and long-term care settings. Approximately 80 cases per year involve a victim collapsing in a public place, and half of these cases receive bystander CPR. On average, 10 to 20 cases per year involve a lay rescuer administering a defibrillatory shock from an AED. As part of a new program intended to track AED usage in the region, the service implemented a lay rescuer support initiative. As part of the program, paramedics flag sudden out-of-hospital cardiac arrests for follow-up by a community safety specialist (P.S.). The goals of the program are to track bystander CPR rates in the region, provide public education and safety planning, and provide emotional support and referral services to lay rescuers.

Procedures

Our recruitment procedures were integrated into the existing lay rescuer follow-up program. After being notified of a cardiac arrest event in a public setting, the specialist attended the scene, typically with 24 hours of the event, and attempted to make contact with the lay rescuers involved. At the initial point of contact, the specialist gathered more detailed information about the circumstances of the event, downloaded any available data from an AED (if one was used), provided written follow-up care instructions that describe emotional and psychological reactions to traumatic events, and facilitated referrals to mental health services if desired. For the purposes of this study, the specialist also outlined the goals of the research in broad terms and solicited verbal consent to be approached to participate in the study. Lay rescuers who expressed interest in participating were scheduled for a subsequent, more detailed follow-up session, typically within 1 or 2 weeks of the incident. Either the principal investigator (J.M.) or the specialist (or both) would attend the session and provide a detailed verbal and written explanation of the goals, procedures, and potential risks (eg, psychological or emotional distress) of the study. After fully informed written consent, these sessions were audio recorded for analysis. Both J.M. and P.S. have experience conducting interviews and moderating focus groups of this kind. Sessions would involve as many consenting participants as were originally involved in the event and would range from one-on-one interviews to larger focus groups of several participants.

Lay rescuers were eligible to participate in the study if they were at least 18 years of age, competent to consent, and had intervened (ie, called 911, performed CPR, and used an AED) in an out-of-hospital cardiac arrest. We excluded cardiac arrests occurring in home settings. Recruitment and data collection occurred between November 1, 2015, and November 1, 2016.

Data Collection

The interview and focus group sessions were intended to be semistructured. Although the research team developed an interview guide designed to broadly explore the event

(Table 1), moderating the discussion was left to the discretion of the program specialist. Given the potentially distressing nature of the conversations, we felt that a minimally invasive approach would be best, prioritizing the emotional support of the participants over the specific questions of the research team. This ethical approach¹⁷ involved allowing the participants to describe the event in their own words, at their own pace, and in accordance with their own comfort levels. Either J.M. or P.S. would ask probing questions to explore specific details of interest as deemed appropriate given the emotional dynamic of the conversation.

Recorded sessions were transcribed verbatim including the utterances, pauses, and paralinguistic of the participants. The principal investigator reviewed all transcripts with the original recordings, verifying accuracy, and correcting discrepancies as necessary before importing the completed transcripts into NVivo for Mac (QSR International) for analysis.

Data Analysis

In constructivist grounded theory,¹³ data collection and analysis occur concurrently and iteratively, using the method of constant comparison. For the purposes of this study, our analytic focus was not on the event itself per se but rather on the individual perspectives of the lay rescuers who responded, recognizing that the same event may be experienced and perceived differently by each responder. Our analysis began with listening to the audio recordings and reading the transcripts while making notes to become orientated to the data. Next, we undertook open coding to identify broad categories, using descriptive terms, including the participants' own words.¹⁸ On subsequent reviews of the transcripts, we undertook focused coding to clarify the relationship between identified categories and refine the categories into progressively abstract themes based on conceptual relationships.¹⁹ This process occurred cyclically with data collection, comparing each new transcript individually with each previously analyzed transcript until a point of theoretical sufficiency (or saturation) was reached.²⁰ We defined sufficiency as the point at which progressively fewer new ideas were identified during data collection, the research team was satisfied that all relevant

Table 1. Interview Guide

	Question/Prompt
1	In your own words, please tell us about your experience. What happened?
2	What was this experience like for you? What thoughts or emotions did you have during the experience?
3	If you feel comfortable, try to picture the event in your mind. What sticks out in your mind as being particularly memorable?
4	What parts of the event did you find cognitively (ie, mentally) challenging?
5	What parts of the event did you find emotionally challenging?
6	What parts of the event did you find physically challenging?
7	If you were able to go back to when you received your CPR training, is there anything that you would want to have been done differently to help you prepare for this event, having experienced it now?
8	How might we use your experience to help teach CPR better?

CPR indicates cardiopulmonary resuscitation.

lines of inquiry had been pursued, and we had achieved a rich, deep description of the phenomenon.^{14,20} At this point, the data were subjected to a final round of selective coding in which the theory was defined. In addition to theoretical sufficiency, we were sensitized by the principles of information power described by Malterud et al²¹ in estimating our required sample size. Information power has been proposed as a means of guiding sample sizes in interview-based qualitative research and suggests that when the participants are carefully selected, the study draws on existing theory, and the quality of the dialogue is high; smaller samples may reasonably be anticipated.²¹

During data collection and analysis, we recorded handwritten notes using the memo-writing technique.^{14,22,23} Memos were intended to document initial interpretations of the data, highlight areas for follow-up, track methodological decisions, provide additional granularity for identified themes, and support the team's reflexive process, a hallmark of constructivist research approaches.²⁴ Observations from the field collected as part of the memo-writing process were transcribed by the principal investigator and attached to the respective focus group/interview transcripts and incorporated into the data analysis and coded in the manner described above.

Rigor and Trustworthiness

We engaged in many strategies to ensure methodological rigor and strengthen the trustworthiness of the results. These included using a well-established methodology with clear procedural guidelines,²⁵ obtaining a deep description of the phenomenon²⁶ and maintaining a reflexive awareness of preconceived ideas, personal beliefs, and prior experiences.^{24,27} We also engaged in investigator triangulation²⁸ during coding (between J.M. and P.S.). Finally, we also consulted with peers from a variety of clinical and research backgrounds to enhance the clarity of the theory we were constructing from an external, end-user perspective.

Researcher Characteristics

Our research team blended both clinician and nonclinician perspectives, with J.M. and W.T. having clinical duties as practicing paramedics. J.M. is an advanced care paramedic with 13 years of experience and a faculty member at Centennial College in Toronto, Ontario, with teaching responsibilities in the paramedic program. This study was undertaken when J.M. was completing a Master of Science degree as a parallel study to his thesis work; J.M. is now completing a PhD in health research methods. W.T. is an advanced care paramedic with 20 years of experience, the coordinator of the paramedic and research programs at Centennial College, and an education scientist with the University of Toronto. W.T. holds a PhD in health research methods and assumed the supervisor role for this study, providing conceptual and methodological guidance during all phases of study completion. P.S. does not have clinical duties but is affiliated with the Canadian Red Cross society and certified as a CPR instructor, in addition to his roles within the paramedic service as described above. Collectively, our stance toward the research was intended to explore the experience of lay rescuers who have performed CPR, particularly from an education perspective,

with the goal of identifying ways in which CPR training might be enhanced.

RESULTS

We achieved theoretical sufficiency after 6 out-of-hospital cardiac arrests and included a total of 15 lay rescuers in the study. None of the lay rescuers who were approached to participate in the study declined to participate. We conducted a single one-on-one interview and 5 focus groups (ranging from 2 to 7 participants), with sessions typically lasting 45 to 90 minutes in duration, and all occurring at the workplace of the participants. Eight of the participants were male, and the participants had an average age of 45.6 (SD 13.5) years. All of the participants had completed CPR training in the past, either through their workplace during in-house workshops or through formal training courses; however, none had previously performed CPR on an actual cardiac arrest victim. In 4 of the cases, the victim had a return of spontaneous circulation during resuscitation by paramedics (ie, after the involvement of the lay rescuers had ended) at the scene, and in 3 of the cases, the victim survived to hospital discharge. Our data also included 30 pages of hand-written field observations that were incorporated into the analysis.

We identified a common experiential process among lay rescuers: being called to act, taking action, and making sense of the experience. Each is described in more detail below. To maintain confidentiality, we have substituted sex and culturally consistent pseudonyms for the lay rescuers, victims, and any other named individuals (see Table 2 for demographic characteristics of quoted participants).

Being Called to Act

"I grabbed him so he didn't hit the floor, and then I noticed that he was sweating and gasping for air. That was the first sign. As soon as I got a hold of him [I screamed] 'Mark! Mark! Stay with me!'" ('George')

Seeing the person collapse was distressing. Color changes (eg, cyanosis), convulsions, incontinence, a loss of muscle tone, snoring, and gasping respirations were felt to convey a sense of immediacy and an acknowledgment that the victim's condition was serious. The lay rescuers' focus of attention tended to fixate on the victim's face and their apparent lifelessness: "The way his eyes were, like a normal person's eyes are not like that ... *Why? Why did his eyes look like that?*" ('Scarlett'). All of the participants commented extensively on the color changes they saw in the victim's face, describing the victim as turning fifty shades of blue or purple. Never having seen a person in cardiac arrest before, our participants felt unprepared for the experience.

Table 2. Participant Demographic Characteristics

Pseudonym	Sex	Age	Incident Description
Edward	M	50	A coworker had collapsed on a factory floor. Scarlett witnessed the incident and called 911, Edward performed chest compressions, and Chung used an AED. The victim died.
Chung	M	37	
Scarlett	F	35	
David	M	63	A coworker collapsed in an office. Jacqueline discovered the victim and performed chest compressions, David administered artificial respiration. The victim survived.
Jacqueline	F	57	
Devin	M	24	George and Devin witnessed a coworker collapse on a factory floor and George started CPR. Emeret arrived to assist, and the victim ultimately survived.
Emeret	M	49	
George	M	65	
Rachel	F	44	Rachel witnessed a coworker collapse and administered CPR. The victim ultimately survived.
Justin	M	24	Justin was alerted to a customer having collapsed in the change room of the gym he was working in and arrived to administer CPR. The victim ultimately died.
Sandra	F	38	Sandra and her colleagues discovered a coworker unresponsive in his office chair. Sandra helped to lower the victim to the floor, called 911, and went to get the office AED. Jonathan began CPR. The victim ultimately died.
Jonathan	M	30	

AED indicates automated external defibrillator; and CPR, cardiopulmonary resuscitation.

"We just kind of looked because you couldn't do mouth to mouth because there was stuff [emesis] coming out of his mouth, so I just sort of shoved my hand under his nose to see if there was anything. It was messy, *I was not prepared for that.*" ('Jacqueline')

The sudden, unexpected shock of the event, combined with the graphic manifestations of cardiac arrest often imparted a sense of panic, momentarily immobilizing some and galvanizing others to action – even if they didn't know what to do: "Having somebody *go down like that*, it's the first time I have ever seen something like that. It was like "Oh [expletive]! What is going on?" ('Devin')

"And I went to him and I *saw him* and I *saw his face* and his body and I just [crying], thought for a second 'What do I do?' and I just ran *so fast*, and I didn't even know how to call – I touch my phone all the time and I didn't remember my password – and I just ran to the [office] door and I *hit the door so hard* and I *screamed so loud* and I said 'Kristina! Kristina! Call 911 now!'" ('Scarlett')

Although often reluctant to discuss it explicitly, this sense of panic and urgency was prompted by an

awareness on some level that the person's life was in danger: "When he started to go blue it's like you know the person's...[quiet voice] *dying*" ('David'). The urgency of the situation ultimately cut through the panic, shock, and disbelief and prompted the realization that without immediate intervention, the person would die: "That's enough to throw someone into panic mode, like no one else stepped in, everyone else was just looking. But *you've got to get past that*" ('Jacqueline').

Taking Action

While the participants in our study were committed to helping the victim, for a variety of reasons, they were unsure what action to take given the situation. For example, one participant commented that his CPR certification had expired, preventing him – he thought – from coming to the aid of the victim. Other participants were similarly concerned over liability and discipline (ie, in the workplace) if they attempted CPR if they had not been previously (or recently) trained.

Particularly in workplace settings, taking action was occasionally complicated by unforeseen logistical issues. For example, there was not always an AED available, or the AED was a considerable distance away. In some cases, the workplace emergency plans called for trained responders to be mobilized, but paging these responders to the scene was problematic. In one incident, an employee on the workplace response team was off-duty and received a call while at home that she was urgently needed on the factory floor for an injured worker.

Taking action to resuscitate the victim was further complicated by fact that the lay rescuers were frequently not aware that the victim was in cardiac arrest: "When I saw him on the floor, he's not moving, he's turning blue, something is clogging something, right?" ('Edward'). This occurred in 4 of the 6 cases where the lay rescuers interpreted cyanosis, emesis, and gasping to mean that the victim was choking.

"We flipped him onto his right side and there were still fluids coming out and it was like a deep rasping noise and you could hear he was trying to breathe but he couldn't. I have little kids that have choked, [so] I just pounded him on the back and when you did that, you'd hear him do this [large gasp] so there was air going in, which was good so we just kept doing that and as soon as that stopped a little bit, we just put him on his back and then I jumped on his chest and tried to do the compressions. ...We had to flip him again because the liquid started coming out of his mouth again so we were pounding him on his back again, so that happened three times." ('Jacqueline')

Agonal respirations were common in our sample, and in almost all cases, the lay rescuers interpreted this finding to mean that the victim was not in cardiac arrest: "He took a big breath and we turned him side-ways and I thought he was alive" ('Edward'). In other cases, the lay rescuers would observe the victim take an agonal gasp and stop CPR in the mistaken belief that they had successfully resuscitated the victim: "We actually interrupted CPR because we saw the breathing, but we shouldn't have stopped, should we?" ('David'). This reflected a common perception that the victim had to be apneic to perform CPR, a misconception that appeared to be motivated (at least in part) out of a concern for hurting the victim: "What if he's alive and you're doing CPR? And then you're in big trouble because then you're *potentially killing him*" ('Justin').

Physically performing CPR and using an AED proved to be challenging for the lay rescuers for several reasons. Some participants commented that they were unsure about appropriate land marking for compressions, "but I figured anywhere around the chest is a good thing" ('Chung'). Others devoted significant attention to counting the number of compressions and cycles of CPR performed, thinking this information would be needed by the attending paramedics.

"We started doing compressions and [my coworker] is shouting at me 'Are you doing compressions?' and I said 'Yes!' and she said 'Are you counting?' and I said 'Yes! Stop shouting at me! I've lost count!'" ('Rachel')

One participant adopted a mantra to keep herself on pace when delivering chest compressions, repeating 3 words over and over: "*Please. Don't. Die.*" ('Jacqueline').

With respect to using an AED, the lay rescuers encountered specific difficulties using defibrillators that were often different from the machines they had initially trained with. In one case, 2 of the lay rescuers attempted to cut an elongated S-shaped defibrillator pad into 2 separate pads because the defibrillator they had used during training used 2 smaller pads. In other cases, the lay rescuers had difficulty hearing the audio prompts of the machine (ie, because of background noise and stress) or interpreting the color-coded buttons on the machine:

"When I looked at it, 'Green Means Go' and 'Red Means Stop' So I had to do a double take to make sure I didn't turn off the machine. Because the buttons are so small I had to read 'Power' (the green button) and 'Shock' (the red button)." ('Chung')

Others tended to misinterpret the prompts from the defibrillator, thinking the beeping metronome meant that they were performing compressions incorrectly.

One participant summarized the difficulty by saying "I was really guessing as to what the machine wanted me to do." ('Emeret')

Making Sense of the Experience

After the victim had been transported to hospital, the lay rescuers were left to attempt to decompress and process their experience: "We all got the training, but *this* is (sighs) – until the occasion arises where you have to use it, you never know" ('Sandra'). Our participants commented on the whirlwind of unanswered questions and emotions they faced after the event.

"I had given the police my statement and I got to my car and I cried and I called my father and I thought to myself 'Am I allowed to share this? Am I *allowed* to tell anybody?' and like 'How am I supposed to keep this to myself' and 'Did I sign anything saying that?' ... and I couldn't drive home because I was shaking, so I sat in my car." ('Scarlett')

Although 4 of the victims achieved a return of spontaneous circulation during resuscitation by the paramedics, none of the victims regained consciousness as a direct result of the lay rescuer intervention, and in half the cases, the victim ultimately died. This left many of our participants wondering: "Why didn't it work?" ('Edward'). Given that most of our cases occurred in workplaces, the lay rescuers eventually found out that the victim died, leaving them with unanswered questions and numerous doubts:

"When I heard word [that] he passed, that was hard, because I, and I found out that night, so I thought 'Is it because of me?' Is it because I didn't run fast enough? Was I supposed to start the process?" ('Scarlett')

The experience proved to be disturbing for many of the lay rescuers, and they disclosed having a variety of distressing emotional and psychological symptoms after the event. These included disturbing flashbacks (often triggered by seeing the colors blue or purple, or by a relative's snoring), difficulty sleeping, social withdrawal, difficulty concentrating, and experiential avoidance behaviors. One participant was having a particularly difficult time processing the experience and shared:

"I'm still *messed up*. I don't sleep. I can't see the color blue, like certain blues just freak me out right now. Umm, like sometimes you're having a conversation, you don't feel like you're even in the room. It's weird, I can't even explain it ... I can't go in the room [where the incident occurred], I can't even look at that door because my anxiety goes through the roof." ('Jacqueline')

As part of routine follow-up, the program specialist would leave written aftercare instructions with the lay rescuers that included descriptions of anticipated symptoms and contact information for crisis hotlines and community mental health services. Although the participants accepted this information, they often disclosed seeking out other forms of postincident support, including online resources, family physicians, and employee assistance programs. Ultimately, some participants began to accept the experience and their role within it, noting “It’s reality; it’s part of life” (‘Jonathan’), and telling themselves “*I tried*” (‘Justin’).

The experience seemed to be formative, with the participants articulating a sense of readiness to intervene in a future emergency and reflecting on what they might do differently if a similar event occurred again. One participant commented: “It’s like everything around you has just changed. It’s *not just a workplace anymore*, you kind of feel like you have a bigger responsibility here” (‘Justin’). Although the long-term effects of the experience on our participants remain unknown, at the end of the follow-up sessions, many were articulating a sense of closure:

“After hearing what happened, I finally felt at peace and I went home and I had a good night’s sleep for the first time in days and I just felt better. It’s a very sad situation, but I realize that I couldn’t have done anything different ... I’ve got the answers. I’ve got the information I needed. I’ve had the rest, now it’s time to move forward.” (‘Scarlett’)

DISCUSSION

Bystander CPR has been shown to be an important predictor of survival from out-of-hospital cardiac arrest^{2,3}; however, few studies have attempted to qualitatively explore the experience from the perspective of the lay rescuers. Our goal was to explore this phenomenon in detail, and we identified many features that threaten optimal CPR performance (eg, difficulty identifying cardiac arrest, misconceptions about CPR) and raise questions about the aftercare of lay rescuers. Our findings have potentially important implications for CPR training and for supporting lay rescuers after a sudden cardiac arrest.

In one of several social media advertisements by the British Heart Foundation, ‘mafia’ tough man ‘Vinnie’ Jones describes the steps to hands-only CPR: “Check him over. Call 999. Push hard and fast to the beat of Stayin’ Alive. Hands-only CPR: It ain’t as hard as it looks”.²⁹ The American Heart Association released a similar video,³⁰ and both reflect a growing effort to make CPR training more accessible, reconceptualizing the procedure from complicated to easy-to-perform. Although these efforts have the desirable effect of

removing barriers to learning CPR and have been credited with saving several lives,²⁹ ‘Vinnie’ Jones’ assertion that “It ain’t as hard as it looks” may not be true. Despite good intentions, social media campaigns and other ultrashort CPR instruction techniques run the risk of oversimplifying the procedure, leaving lay rescuers inadequately prepared for many challenges both during and after the incident.

Our participants commented that their CPR training was fun and engaging but ultimately left them unprepared for the reality of the experience. Aside from the distressing emotional response, the physical manifestations of cardiac arrest (eg, cyanosis, incontinence, and convulsions) prompted many misconceptions, suggesting their training had fallen short on a conceptual level. Misinterpreting cyanosis to mean the victim was choking or believing the victim had to be apneic to initiate (or continue) CPR suggests that important knowledge gaps remain. This suggests there is an optimal balance between accessibility and realism in CPR training that has yet to be found.

In simulation-based learning, clinical settings, problems, or tasks are recreated in controlled learning environments to facilitate experiential learning and deliberate practice.³¹ Simulation has the advantage of allowing learners to practice infrequently used skills repeatedly while neutralizing concerns over patient safety³² and is commonly used during CPR training programs in the form of partial task trainers that replicate the haptic feedback of performing CPR. Although the role of fidelity in simulation has been debated,^{33,34} current thinking encourages careful alignment between the design of the simulator and the functional requirements of the particular task to be learned.³⁵ This functional task alignment³⁵ requires considering and reproducing (as much as practicable) the relevant physical, cognitive, and emotional influences on performance during training.³⁶ Although partial task trainers, mall kiosks, and other innovative CPR training solutions might suitably replicate the psychomotor skill of performing chest compressions, our results would suggest that the training fails to consider important cognitive and emotional processes present in an out-of-hospital cardiac arrest.

Many of our participants expressed difficulty processing the experience of providing CPR. In our sample, intrusive memories and flashbacks were common, and most participants disclosed sleep disturbances and social and experiential avoidance behaviors. Previous investigations into the impact of providing CPR have suggested that long-term psychological sequelae among lay rescuers are rare.^{9–12,37,38} Despite methodological limitations, some commonalities in the work bear consideration. Providing bystander CPR has been framed as taking moral responsibility for another human being’s life¹² (p. 6), and CPR is commonly conceptualized as a life-saving intervention. Unfortunately, lay res-

cuers tend to link the outcome of the victim with the quality of the care they provide, feeling responsible if the victim ultimately died.^{9,10,12,37} The participants in our study articulated similar sentiments. Providing post-incident debriefings is a viable option for alleviating this perceived burden of responsibility by allowing the lay rescuer to discuss the incident with a knowledgeable healthcare professional.³⁷ Although not intended as a goal of the research, our participants were grateful for the opportunity to participate in a structured debriefing and receive feedback about the incident.

Our study is unique in that our participants were not selected based on self-reported participation in a cardiac arrest, none were healthcare providers, and the follow-up occurred shortly after the incident. Although we identified a variety of short-term negative emotional reactions, the long-term psychological effects of the incident remain unknown, and we did not quantitatively measure psychological distress among our participants. Future prospective studies would do well to consider robust short- and long-term follow-up for lay rescuers after performing CPR.

Limitations

Our study should be interpreted within the context of certain limitations. First, we acknowledge the possibility of recall bias among our participants. The experiences were stressful for the participants, potentially limiting the accuracy of their recollections. However, given our study focus, we were more interested in the subjective experience of the lay rescuers rather than an accurate reporting of what transpired. Second, we note that the lay rescuer follow-up program was a new initiative in the region at the time of the study and depended on (optional) referrals from the treating paramedics. Consequently, it was not always possible for us to be aware of every eligible case occurring in the community, and we do not know how many cases we missed. However, we note that within a constructivist epistemology, our goal in the research was not to achieve representativeness or generalizability per se, concerned instead with thoroughly investigating the cases we were able to access. Third, the majority of the incidents took place in workplace settings and the victims were generally known to the lay rescuers, perhaps conferring a degree of stress that might not otherwise be present if the victim was a stranger. Although we are confident in our decision to terminate data collection having achieved theoretical sufficiency, we acknowledge that our analysis was limited to a specific context. Evaluating our theoretical framework in other, nonworkplace contexts is a potentially informative opportunity for future research. Finally, although we identified that the experience was distressing for the participants, our study was not designed to assess the long-term impact of intervening in a sudden cardiac arrest.

Conclusions

In our exploratory qualitative study, we found that being called to act is a distressing experience, prompting a sense, shock, and disbelief. Ultimately, our participants overcame these uncomfortable emotions and took action to attempt to save the victim's life; however, we identified important knowledge gaps that current CPR training programs may not be adequately addressing. Finally, making sense of the experience was difficult, and our participants articulated a variety of short-term psychological sequelae suggesting the experience may be traumatic. We suggest our study has important implications for CPR training and raises questions regarding the appropriate aftercare of lay rescuers involved in out-of-hospital cardiac arrest.

ACKNOWLEDGMENTS

We wish to acknowledge and thank the participants for their contribution to the research and for their selfless actions in attempting to save the lives of the victims of the cardiac arrest events described here. We also wish to thank Dr Stella Ng, Madison Brydges, Jason Buick, and Jacqueline Forsey for their helpful reviews of our article.

DISCLOSURES

None.

AFFILIATIONS

From the Wilson Centre, Toronto, Ontario, Canada (J.M., W.T.); Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Ontario, Canada (J.M.); Peel Regional Paramedic Services, Regional Municipality of Peel, Brampton, Ontario, Canada (J.M., P.S.); Department of Post-Graduate Medical Education, University of Toronto, Ontario, Canada (W.T.); and York Region Paramedic Services, Regional Municipality of York, Sharon, Ontario, Canada (W.T.).

FOOTNOTES

Received June 21, 2017; accepted December 7, 2017.

Circ Cardiovasc Qual Outcomes is available at <http://circoutcomes.ahajournals.org>.

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Justin Mausz, Paul Snobelen and Walter Tavares

Circ Cardiovasc Qual Outcomes. 2018;11:

doi: 10.1161/CIRCOUTCOMES.117.004035

Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

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Print ISSN: 1941-7705. Online ISSN: 1941-7713

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