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Experimental paper

"I can't unsee him lying in my kitchen": Understanding the trauma of family members who witness a loved one's cardiac arrest

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Abstract

Background: While there is a growing body of research in the field of post-cardiac arrest outcomes and survivorship, the lived experience of close family members who witness the arrest itself and who may have performed CPR, has not been specifically explored.

Methods: We employed qualitative interpretive descriptive methodology using key informant interviews for data collection. Participants were recruited internationally, and interviews were conducted virtually following a semi-structured format. Thematic data analysis was conducted using a constant comparative approach.

Results: Interviews were conducted with 33 family members who were present at the time of their loved ones cardiac arrest. Across the participant stories, we identified the core concept of 'base trauma' that centres around what family member witnesses initially experience at the time of the arrest itself. We postulate that this core theme influences six significant patterns of experience including: 1) feelings of responsibility, 2) fear of recurrence without them, 3) the impact of reliving the event, 4) the inability to escape triggers, 5) the delayed realization of their own trauma, and lastly 6) dealing with psychologic disconnect.

Conclusions: There is increasing research evidence that family members of cardiac arrest survivors have their own challenges as part of the recovery journey. We introduce novel concept of the compounded impact of the initial base trauma those that witness and respond to a loved ones cardiac arrest have. The nuanced experiences of this group point to the need to normalize their experience as a 'trauma' and suggest that support pathways need to recognize this.

Keywords: Cardiac arrest, Family members, Co-survivors, TRAUMA, Qualitative research

Introduction

Out-of-hospital cardiac arrest (OHCA) remains a significant public health problem, with more than 400,000 cases every year in North America.[1] What is significantly underappreciated is that approximately 75% of OHCA occur at home, which exponentially increases the probability of a close family member, often the spouse or a partner, witnessing this traumatic event.[2] In a 2021 study conducted in Japan, within a cohort of 818 OHCAs, 74.4% were witnessed by a family member.[3]

Increasing awareness of the impact of OHCA beyond immediate clinical outcomes of survival has shifted the focus towards quality of life and survivorship, with healing and recovery after the critical acute care phase now included in the Chain of Survival.[4] Research indicates that OHCA survivors experience diverse recovery trajectories, with many eventually achieving relatively good functional outcomes and reporting satisfactory quality of life.[5,6] However, there is emerging evidence that a significant proportion also report ongoing non-cardiac sequelae including cognitive, psycho-social and emotional symptoms.[7–10]

Close family members of OHCA survivors have been shown to be at increased risk of psychological disorders, including posttraumatic stress symptoms (PTSD), sleep disturbance, depression and anxiety.[7,11–13] While there is a growing body of qualitative research emerging in the field of post-arrest outcomes and experiences,[14–18] research that specifically explores the lived experience of close family members *who witness the arrest itself* and who may be (or who are unable to be) the first to administer cardiopulmonary resuscitation (CPR), is lacking.

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The impact of *witnessing* the unexpected death of a loved one warrants further study with the aim of informing the design of future support systems that help address specific issues for this group that are rooted in their unique experiences related to the event. This study aimed to hear, understand, and give voice to the unique experience of those who bear witness, and, in many cases, who initiate resuscitation efforts, following a loved one's cardiac arrest.

Methods

Study design

This study was designed using a qualitative interpretive descriptive approach[19] with in-depth key informant interviews as the main method of data collection. Interpretive description was felt to be most appropriate as it aims to address complex experiential questions while producing practical outcomes.[20,21] Our study design allowed advancement of knowledge located within the existing literature so that findings can be constructed on the basis of thoughtful linkages to the work of others in the field. Research Ethics Approval was obtained from [Name redacted for peer review] Research Ethics Board (#22-0003).

The research team

The research team is made up of two researchers whose programs of research focus on understanding various facets of survivorship and co-survivorship after sudden cardiac arrest. One is a female qualitative social scientist (KND), and one is a male neurointensive critical care physician and mixed methods trialist (SA). Both are located in major urban centres in Canada and the USA, respectively. The interviews were conducted by a PhD trained research coordinator (MBS and KA) with extensive experience in qualitative methods. Data analysis involved the entire team and the initial conceptualizations of the themes were discussed with survivor and family partners who work with the primary author.

Study population

The population for this study was English-speaking adults, who are close family members that witnessed the cardiac arrest of their loved one. The interviews were restricted to being conducted in English due to the expertise of our research team and study resource constraints, however we did not restrict location of the participant (recruitment was advertised internationally). We aimed to focus the time since arrest to approximately 5 years in order to promote participants' depth of recall about what this experience was like for them and its impact on their lives, however we did not turn away any volunteer participants.

Participant recruitment and sampling

Participants were recruited through international OHCA survivor and family member networks, support groups, and longitudinal cohorts including the Canadian Resuscitation Outcomes Consortium Public Engagement Network,[22] the Heart & Stroke Foundation of Canada People with Lived Experience Team,[23] the Sudden Cardiac Arrest Survivors Group,[24] the Loved Ones of Survivors–SCA & Heart Attack Group,[25] the Sudden Cardiac Arrest UK,[26] and the Cardiac Arrest Neuropsychosocial Outcomes Evaluation – Family – Study. The study advertisement letters and flyers were shared with members by email or posted on the organization's websites. Facebook group or group webpage with the permission and support of group moderators. Interested participants were asked to contact the research team directly to learn more about the study and schedule an interview.

We used a mix of a convenience and purposeful sampling techniques[27,28] with the aim of including participants with a range of socio-demographic characteristics including age, gender, relationship to the survivor, and geographic location. We also used some snowball sampling by asking participants to share information about this study with anyone known to them who had witnessed the OHCA of a loved one.[29] This technique is frequently used in research when the target population is hard to reach, as was the case with this study.[28] All participants were given an opportunity to review a letter of information and consent form and ask the research team questions. Verbal consent from the participant was recorded prior to each interview.

Data collection

We conducted individual, in-depth, semi-structured interviews[30] with people who had witnessed the OHCA of a loved one. The interviews were conducted by telephone or virtual conferencing software based on the participant's preference to facilitate participation from a comfortable and private location and to reduce geographic bias in recruitment. Interviews were supplemented with field notes, which are commonly used in qualitative research to collect data that cannot be captured on audiotape, such as emotional aspects and dynamics of the interview, and to document the researcher's preliminary analytic insights.[31]

The interviews were conducted in a conversational manner following an interview guide (Appendix A) developed by our multidisciplinary team to address key topics of interest, including understanding the story of their loved ones' cardiac arrest, their experience of witnessing the arrest and providing CPR (if applicable), and the impact of the event on their health, social relationships, and subjective wellbeing. In order to promote the generation of truly participant-led accounts that reflect the varied histories, experiences, and modes of expression of the participants, the specific order and phrasing of the interview questions remained flexible based on how and what participants shared. All interviews were digitally recorded and transcribed verbatim by an external transcription service.

In keeping with the iterative process of qualitative methodology, data collection and analysis were conducted concurrently in this study and the final sample size was determined by thematic saturation.[32] This was defined as the point at which the research team agreed that most viewpoints were accounted for, and additional interviews were unlikely to provide new insights into developing themes. Saturation was continuously monitored throughout the data collection process through discussion with the research team.[32–34] As a way to exercise triangulation,[35] we included previously collected interview data using similar methodology on five close family members who had witnessed cardiac arrest. These interviews were conducted and analyzed by the same project team members as this present study. This was planned to interrogate the strength of our research findings and discern the consistency of core patterns identified in the current study.

Data analysis

Data analysis was conducted using an interpretive descriptive approach and involved interpretation that highlights how the themes and patterns found in the data interact in a novel and meaningful way.[19] We repeatedly immersed ourselves into the accounts of the participants prior to developing themes. This allowed us to capitalize on processes such as synthesizing, theorizing, and recontextualizing rather than simply sorting and coding within each account.[36] This was ideally suited to this study as it required refining the inquiry, testing the developing conceptualizations, and challenging the abstractions that were emerging between and among the narratives through constant comparison.[36]

The members of the research team (KND, MBS and KA) with extensive qualitative methodological expertise independently reviewed five transcripts, attached descriptive codes to segments of the text, and then developed an initial coding tree, and shared preliminary conceptualizations about the codes. These emergent codes were then used to guide an analysis of the entire data set to identify overarching sub-themes, and the sub-themes were compared within and across each transcript to discern a core pattern in the way that participants viewed and experienced being a witness to their loved one's cardiac arrest. To promote analytic rigor and trustworthiness of our findings, the research team met regularly to discuss interpretations, returned to the transcripts to seek alternate explanations, and continually reviewed the coherence of our emerging understanding of participants' perspectives.

Results

Between January 2018 and July 2023 (interrupted by the COVID-19 pandemic), we interviewed a total of 33 family members who had witnessed the cardiac arrest of a loved one. The interviews were approximately 75 min in duration (range: 50–105 min). The majority (94%, $n = 31/33$) of participants were spouses or partners of the cardiac arrest survivor, female (71%, $n = 20$), and the median time since the arrest was 5 years (range 6 months to 20 years). Participants were mostly from Canada, USA and the UK; demographics for all participants are provided in Table 1. The loved ones of all of our participants ultimately survived their cardiac arrest although some did pass away later for other reasons.

Our analysis revealed that the experience of this group seems to be uniquely informed by a core theme which we have labelled the initial "base trauma" of being present at the arrest itself. This core theme influences six significant patterns of experience including: 1) feelings of direct responsibility for outcomes, 2) increased fear of recurrence, 3) the impact of reliving the event in their mind, 4) the inability to escape triggers related to the event, 5) the delayed realization of their own trauma, and lastly 6) dealing with the psychologic disconnect between their experience and external expectations. We describe these themes in detail below with exemplar quotes from the data (additional quotes included in Table 2).

Early traumatic reactions or base trauma

Despite the heterogeneity of the OHCA stories from our participants, we identified a core concept within the data that centred around what family member witnesses initially experience *at the time of the arrest itself.* We have labelled this concept as the '**base trauma**'. This term is meant to reflect the conscious and unconscious initial impact of what was witnessed, who it was witnessed on, and the significant post-arrest experiences set in motion from that base trauma. It is important to note that this base trauma seems to manifest as separate from ongoing distress experienced in being a co-survivor/caregiver of an OHCA survivor, or as a product of the bereavement process. However, our conceptualization of the impact of 'base trauma' likely underpins the "co-survivorship" concept – those family members who were present at the time of their loved ones arrest are in fact surviving their own trauma. We depict the relationship of the six sub-themes described below to the core concept of base trauma visually in Fig. 1.

Feelings of guilt and responsibility

Almost all family members we interviewed spoke about the weight of responsibility they felt for the outcome of their loved ones' cardiac arrest because they had been present or were the first person to respond to their loved one during the crisis. Participants who performed CPR (67%, $n = 22/33$) described an "inner monologue" of knowing what to do but second guessing if they had done it correctly, being unprepared for the sounds and sensations of performing CPR on a loved one. They talked of feeling tremendous guilt about causing physical harm to someone they love (e.g., breaking their ribs during CPR), their awareness of their role in what the outcome of the event would be, and fervently hoping that their loved one would survive. They recounted having overwhelming emotions of shock and confusion at the time of the event while trying to focus on performing CPR as "the adrenaline kicked in" and feeling the weight of their loved one's life in their hands. Even after their loved ones had been discharged from the hospital and were home again, the feelings of guilt and responsibility lingered and impacted participants' daily lives and relationship with the survivor.

> *could barely talk [to the 911 operator]. I spoke in a whisper. I was very strong on the outside, but I was crumbling on the inside. And I had to be strong, right? I had to take care of the situation and had to provide. And I had to be able to think and all of those things and it was very hard to think... And now I can't help but question myself: What if I had noticed sooner? Did I call 911 quickly enough? Did I push hard enough? Is what I did responsible for why he can't remember anything? [P7]*

Fear of recurrence without them

Many described living in a persistent state of hypervigilance about their loved one's wellbeing and needing to be with or knowing the whereabouts of their loved one at all times in the days, weeks, and months after the OHCA. Participants told us they were most afraid of their loved one having another cardiac arrest when they were not with them. This made them want to be near their loved one at all times should it be necessary for them to respond to another health emergency. Importantly, this state of hypervigilance became a "new normal" for many family members, rather than something that lessened over time.

> *When she [daughter, OHCA survivor] started back at school, initially for the first two days for both the teacher's peace of mind and mine, I went to school... It was to sort of reassure me and to reassure the teachers that if anything happened, I'd be there to respond... It was really stressful. It was really difficult to leave her. It was really difficult not to just sit in the car outside her school just in case. [P14]*

Table 1 – Study participant characteristics.

STUDY ID	Relationship (S=Spouse/Partner; P=Parent; AC = Adult Child)	Gender (M/F)	Age Range	Time Since SCA	Performed CPR (Y/N)
P1	S	M	50–60	3 yrs	Y
P2	S	F	30–40	4 yrs	Y
P3	S	F	40–50	3 yrs	Y
P5	S	F	60–70	1.5 yrs	Y
P6	S	F	60–70	1.5 yrs	Y
P7	S	F	40–50	11 yrs	Y
P9	AC	M	30–40	4 yrs	Y
P10	S	M	50–60	1 yr	N
P12	S	F	50–60	2.5 yrs	Y
P13	S	F	60–70	20 yrs	Y
P14	P	F	40–50	6 yrs	Y
P15	S	F	60–70	15 yrs	N
P16	AC	M	20–30	2 yrs	Y
P17	S	F	50–60	9 yrs	N
P18	S	M	40–50	2 yrs	Y
P20	S	F	50–60	5 yrs	Y
P21	S	F	30–40	1 yr	Y
P23	S	F	60–70	3 yrs	Y
P24	S	F	70–80	6 yrs	Y
P25	S	F	40–50	5 yrs	N
P26	S	M	40–50	0.5 yrs	Y
P29	S	F	50–60	3 yrs	Y
P30	S	F	40–50	3 yrs	Y
P31	S	M	60+	2 yrs	N
P32	S	F	60+	1 yr	N
P33	S	F	50–60	5 yrs	Y

Reliving the event

Unanimously, the participants recounted the difficulty of involuntarily replaying the events of the arrest in their minds and rethinking every move and every decision made while their loved one was in crisis.

> *I can literally picture the whole thing. It will never go out of my memory. It will never. The memory of that day will never, ever fade in my mind. Now has it gotten better? Yes, through psychotherapy, through talk therapy, through saying 'then this happened, then this happened', and cry, cry, cry. But, you know, look how long it has been, and I still cry about it. [P20].*

The additional micro-trauma that occurs to families with reliving and retelling the details of the event seems to compound with the base trauma of the original experience for participants. Micro-traumas are subtle incidents that can seem minor or insignificant in the moment and, as such, their emotional impact can often be minimized or easily ignored.[37] However, when micro-traumas accumulate over time i.e., cumulative trauma, they have the potential to inflict longer term psychological harm.[37] Participants frequently told us that the activities the survivors found most helpful to reconstruct and make sense of the arrest (*revisiting the scene, meeting the paramedics and hospital staff who cared for them and sharing their stories at OHCA survivor meetings and forums*), were often the most difficult for them to handle because of the impact of reliving painful memories. These types of micro-traumas is something they feel is rarely acknowledged.

The impact of triggers

Another layer of persistent trauma was revealed when participants spoke of the impact of triggers in their day-to-day lives. A trigger is a stimulus that sets off a memory of a trauma or a specific portion of a traumatic experience (*e.g., timing, smells, spaces, sounds, and feelings of stress*) that bring someone back to the event and can be a barrier to completely recovering.[37] The family members we interviewed described such triggers as something they could not escape; however, the impact they experienced each time they were confronted with the triggers felt additive and significant, especially when the cardiac arrest event occurred in their family home.

> *Even today, it's amazing to me that after this much time there's still residual stuff that will, I think, be here forever, but I won't have the response to it or the reaction to it that I do now. At the time, I remember where he fell, I couldn't walk to that place in the house. There was a way to walk around it, to walk into the kitchen and around that spot. I can't unsee him lying in my kitchen. [P5]*

In some cases, family members who were also health care providers required a change of job due to the triggers in their everyday work. Although they may have done CPR a hundred times on a patient in the work context, everything was different after reviving a loved one. Many participants (health care providers and lay people) commented that performing CPR on a loved one changes you as a person and the triggers bring them back to that place and time in a very real way.

Table 2 – Supportive Quotes by Theme.

Feelings of Guilt and Responsibility

- It was terrifying. Yeah, it's getting me choked up again... It was just terrifying. I mean, her face was turning blue, and I was panicking, and I remember hearing some sounds coming out of her, which I later learned was called agonal breathing. So, I was unsure. No one in the CPR classes I had ever taken, had ever talked about the fact that you might hear sounds like that. [P1]
- I didn't do it right. I couldn't break ribs, or something like that, which I found out later is exactly what I should have been doing... I've always felt guilty, for a long time, that I should have been doing the compressions harder. [P31]
- When she [daughter, OHCA survivor] started back at school, initially for the first two days for both the teacher's peace of mind and mine, I went to school... It was to sort of reassure me and to reassure the teachers that if anything happened, I'd be there to respond... It was really stressful. It was really difficult to leave her. It was really difficult not to just sit in the car outside her school just in case. [P14]

Increased Fear of Recurrence

- I'm still triggered by things. The other day I was out in the garden and working for probably a couple hours. And I came in to get water and I called for [Husband]. He didn't answer. And so, I went oh, he must be up in his office. He can't hear me. I went up. Nobody's there. But because he didn't answer, it went right back to that time of [OHCA] him not answering. Then I went out in the garage and saw that his car was gone. When he got home, I said, you can't do that! You need to tell me when you're leaving. All those times bring that stuff back up and that helps lessen anxiety if you just tell me where you are. [P5]
- Even to this day, if I get up in the morning and she's [wife] not downstairs, I hope she's upstairs and alive... If I don't hear her or confirm that she's alive, it makes me anxious. So I don't like her out of my sight. I'm better about it now, but back then, I thought to myself, she could be dead upstairs if she leaves my sight too long. So, I keep checking.....and it still goes on... [P1]
- I would say for the girls and I, if [Husband] doesn't hear us when we call, it makes us a little anxious. And that was extreme in the early days. It's not so extreme now, but certainly for a very long time, every time he didn't answer when we called or every time we heard something drop we would all sort of freak out and check on him. But it's still there a little bit and you can't help but think about it. [P29]

Reliving the Event

- I've had so many nightmares of seeing her the way that she was. I really thought she was not going to make it. And all of those things go quickly through you – how are you going to live your life? I can always visualize [the SCA event]. [P31]
- Once we got home, he wanted to know repetitively every minute of everything that happened. Every minute, every person there, every, everything. And I would repeat it over and over. And we had to go back and see the paramedics at the EMS station. We had to go back to the intensive care unit and find the doctors and the nurses. It was the most horrible thing I could have done. But for years, we would go over [the worst days of my life]. [P15]

The Impact of Triggers

- Now every time I hear, anytime I hear a thud in the house, like, I run in case he is passed out on the floor... Just because it's over doesn't mean it's really over. You just kind of live with it... But I would say, like when the Damar Hamlin thing happened, as an example, that brought up a whole lot of stuff for me, an entire tsunami of triggers. And I appreciated that there are few people who were like, 'Oh my God seeing that on TV, how are you doing?' And it was unavoidable. It was just everywhere. And I think acknowledging it is good. I kind of like it when people remember that this happened and don't just kind of sweep it under the rug because it's very, you know, hard. [P2]
- Even today, it's amazing to me that after this much time there's still residual stuff that will, I think, be here forever, but I won't have the response to it or the reaction to it that I do now. At the time, I remember where he fell, I couldn't walk to that place in the house. There was a way to walk around it, to walk into the kitchen and around that spot. I can't unsee him lying in my kitchen. [P5]
- You know, if it hadn't gone well, if he died, it would have been so difficult to get over those traumatic experiences. I can understand how post-traumatic distress is caused by little reminders. I can just imagine, in time, when I sat in that place again, every time I see the dog, every time you run upstairs where the SCA happened... For me as a [health care provider] it was very easy to imagine how post-traumatic stress works. [P29]
- So now I work in a different area of the hospital, I never went back to the emergency room after that happened... Now I kind of limit myself to work where people don't usually arrest... My PTSD is related to giving people CPR, which was part of my job. [P30]
- The psychological health side of things is that it's now four years down the line and the sound of agonal breathing will haunt me for the rest of my days. And I've come across it quite a lot [at work], unfortunately. The sound of the defibrillator shouting at you to connect the electrodes and stand clear, and everything still sends shivers down my spine... And even now I still, like, we had a really, really poorly patient who was in cardiac arrest the other week and I didn't sleep well for a couple of nights after looking after him because it reminded me of [Dad]. [P9]

(*continued on next page*)

Table 2 (continued)

Delayed Realization of Impact and Lack of Follow-up
• It would have been nice if I had been conferred with about how this might affect me, based on, you know, like drawing on experiences. Shared with me some of the things I might be experiencing and feeling and needing to do to take care of myself. [P1]
• I have PTSD and the [healthcare system], at least in the US, is such that I didn't have a way to get support for myself because I wasn't the patient. And it's expensive to get psychological support and it all depends on what insurance you have... That's not something people suggest to the co-survivor or the caregiver. I think other disease states do a much better job than that supporting the co-survivor in the family than our disease state. [P7]
• There wasn't one person that said to me, you know, you might have posttraumatic stress from this. I think the first response that I would have wanted from any healthcare provider was: 'My goodness, you did CPR for 45 min. You and your daughter did a fantastic job. Look, your husband's alive.' And then to have somebody say at some point in time, ' He came through this neurologically intact. That's because of you and your daughter.' [P13]
Psychologic Disconnect
• There was one other thing I kind of resented. All of his friends always say to me, they go, "Oh thank you so much for taking care of [spouse]. His brother and sister always say 'Thank you so much for taking care of him." Do you think I have a choice? I mean, yeah, I guess I do have a choice. I could walk away. But that's not me. [P20]
• I work at the gym and first aid training, so I've done some CPR training before, but I suppose none of that really prepares you for [a cardiac arrest]. Doing it in real life, and, doing it on a family member are not even remotely the same thing. [P16]
• It was very traumatic going through that, and watching that, and having to actually do CPR on your own husband who you had just been chatting with minutes before and all that. [P29]
• One of the things that in retrospect, has upset me was the response from the 999 woman. And I mean, she wasn't to know that it was my partner. I think she was worried about COVID. But when I started doing the rescue breaths, she stopped me and she said 'Don't do that, just carry on with the compression'. But the rescue breaths, and the compressions were what I'd always been taught... And I suppose I've been haunted since then with the thought that perhaps if I'd ignored her and done what I'd been trained to do – rescue breaths and compressions – the outcome might have been marginally better. [P24]

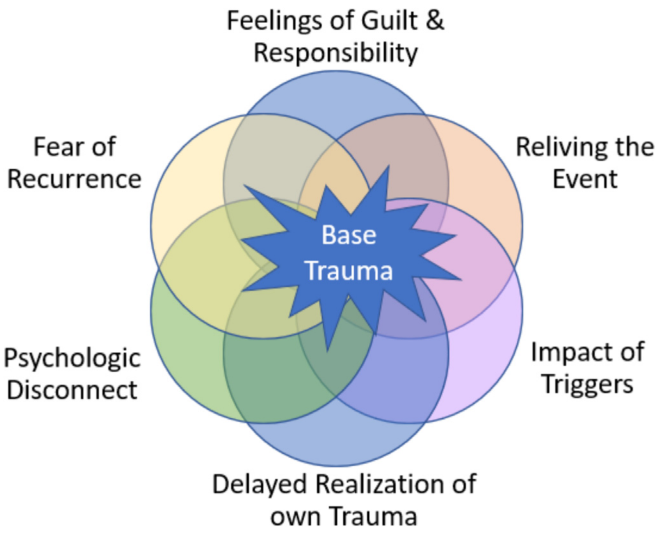

Fig. 1 – Visual representation of theme interaction.

> *So now I work in a different area of the hospital, I never went back to the emergency room after that happened... Now I kind of limit myself to work where people don't usually arrest... My PTSD is related to giving people CPR, which was part of my job. [P30]*

Delayed realization of their own trauma and lack of follow-up

Naturally, at the scene and for the first days and weeks after an OHCA, the focus is on stabilizing the survivor medically or dealing with the grieving process and personal arrangements in the case of non-survivors. The need to step into the caregiving often sees loved ones dissociate from what happened *to them*. Many participants noted that it was not until much later after the event (3–6 months), when things had settled down that they realized the connection of their psycho-somatic symptoms with what they had experienced. They said that it deeply resonated with them when people described it as "traumatic" and reflected that labelling it as such earlier on would have been very helpful to formally acknowledge what they were feeling and to set expectations about their own recovery from the event.

> *You almost want someone to kind of like pull you aside and say, 'Look, here's what the research says about what you have been through. And here's what you should you know. Consider doing this thing and this thing and this thing. And would you mind if we followed up with you?' I think that ultimately there's so much going on and the focus is so much on the patient that is very easy to completely disregard or be following up on your own health. [P2].*

The majority of the participants we spoke to were not provided with an opportunity to debrief with anyone or receive formal follow-up after the event. Participants often noted that speaking to someone at the time of the event would have been very helpful and might have prevented the psychological stress caused by the uncertainty of not knowing the answers to some of their crucial questions about what they did, the cardiac arrest itself, and what to expect both for themselves and their loved ones. Related to their feelings of responsibility described above, they craved answers regarding whether what they did directly contributed to their loved one's outcome, especially after learning about the high risk of poor neurologic outcomes or death after OHCA.

Psychologic disconnect

For many of our participants, there was a significant disconnect between what they were experiencing psychologically after the event, and external expectations of them as the spouse or family member. Once survival is assured, loved ones are typically thrown into the caregiving role with a focus on the survivor's recovery which supersedes their ability to consider what needs to be done for their own trauma and recovery. Being called a "hero" or "lifesaver" was not comfortable for them and contributed to challenging feelings of responsibility for the survivor's outcome.

Table 3 – Recommendations to Help Others.

Immediate Support	• Family member responders should be reassured by emergency services personnel and clinicians in hospital that they did the best they could to support their loved one under terrible circumstances, regardless of the SCA outcome. • Emergency services personnel should provide family members with a card/pamphlet with information about SCA – what it is, what to prepare for, and supports/resources regardless of the SCA outcome. • Family members need to be reminded by emergency services personnel and clinicians in hospital that they need to take care of themselves and be attentive to their own physical, psychological, and emotional health needs given this trauma. • The clinical team should talk to family members in plain language and provide an info sheet of good sources of information, otherwise they will resort to Google for answers. • Family members should be encouraged to write down what the medical team tells them to help them remember, because they are in a state of shock and more likely to forget information.
At Hospital Discharge	• At discharge, have patients and family members consent to being contacted by relevant associations, such as the American Heart Association. • Family members should be asked if they're doing okay, particularly by clinicians while their loved one is in hospital. • More information needs to be provided to family members about what to expect after hospital discharge, in terms of the survivorship journey of both the survivor and their family. • Family members need to be provided with more information about how they will be impacted by the SCA.
CPR Training	• More education is needed about differences between SCA and heart attack (signs and symptoms). • Include information about the realities of administering CPR on a real person (sights, sounds, sensations) and the fact that many people don't survive SCA. • Demystify the legal implications and physical harm (i.e. breaking ribs) that can be caused by performing CPR. Specifically discuss what to do when you have to administer CPR by yourself (i.e. not in a group setting as training is normally done). • Tell people to unlock their doors before administering CPR and calling 911, otherwise you have to leave in the middle of CPR to let the first responders in which is very mentally challenging
Post-discharge support	• Separate supports for both the survivor and family members should be made available, such as support groups and educational resources. • Clinicians who are co-survivors of SCA need specific supports to deal with their trauma and the potential for work-related triggers. • Survivors need psychological follow-up, not just physical follow-up medical care. • Family members should be encouraged to deal with their emotions and trauma as soon as possible, whether through therapy, support groups, or connecting with friends. • Therapy accessed should be trauma informed and ideally delivered by someone with knowledge of SCA. • There is a need for pathways to connect with the people who assisted with the survivor's SCA. This is psychologically healing for some survivors and family members. • Survivors and family members need to be educated that there will be good days and bad days and that survivorship is not going to be a straight line so they can stay focused on looking forward rather than looking back.

> *There was one other thing I kind of resented. All of his friends always say to me, they go, "Oh thank you so much for taking care of [spouse]. His brother and sister always say 'Thank you so much for taking care of him." Do you think I have a choice? I mean, yeah, I guess I do have a choice. I could walk away. But that's not me. [P20]*
>
> *His dad said, 'If it weren't for [you], I would have lost my wife and my only son in the same year.' Which is very nice when you hear it, but it gives you this sense of responsibility that I just don't want. I can't feel like I am working 24 h a day. I can't make people understand how stressful this is for me. [P30]*

The healthcare provider participants also shared that it was expected that they would be "just fine" after performing CPR since it was something they were used to as part of their day-to-day job. However, the experience of resuscitating their loved one was completely different and often quite destabilizing.

Participants who had CPR training noted the stark contrast between the training they had received and the experience of actually doing CPR *on a loved one*. The reality that the chances of having to do CPR on a loved one is high was not well communicated during training and yet it was suddenly their reality.

> *You know, CPR is no joke. And doing it on your partner or loved one is otherworldly. I actually felt my soul come out of my body. I was looking down on myself giving him CPR. I will never ever forget that... It is like nothing you could explain. It's extremely traumatic. I would not wish it on anybody. [P7]*

Recommendations to help others

The participants we interviewed were very forthcoming about their experience as well as things they feel should be done to help family members who are present for a loved one's cardiac arrest in the future. We have included a list of the most common suggestions in Table 3.

> *I want normal again. But normal never, ever comes back. If there's one thing, one message that I would share with you as a researcher and I would share it with anybody is that cardiac arrest is the gift keeps on giving. You never know what challenge is behind the next door. [Recovery] is definitely a marathon, it's not a sprint. And even to this day, the impact is so great, and nobody understands. [P17]*

Discussion

Our conversations with individuals who witnessed and/or provided CPR to a loved one following sudden OHCA have revealed that their experience may be quite nuanced from what has been previously described in the family experience literature. Their personal post-arrest experience seems to be uniquely informed by what we have labelled the initial "base trauma" of being present at the arrest itself. This paper with robust qualitative methodology postulates how this core theme influences six significant patterns of experience including: 1) feelings of direct responsibility for outcomes, 2) fear of recurrence without them, 3) the impact of reliving the event in their mind, 4) the inability to escape triggers related to the event, 5) the delayed realization of their own trauma, and lastly 6) dealing with the psychologic disconnect between their experience and external expectations.

Cardiac arrest is rarely referred to as "traumatic" in the current literature. What the findings of this study have served to do is unpack the influence of the initial witness trauma on recovery and psychological well-being in this unique group. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) defines trauma as *"the symptoms that occur following exposure to an event (*i.e., *traumatic event) that involves actual or threatened death, serious injury, or sexual violence. This exposure could come in the form of experiencing the event or witnessing the event or learning that an extreme violent or accidental event was experienced by a loved one."* [38] Trauma, including one-time, multiple, or repetitive events, affects everyone differently.[39] Cardiac arrest almost always occurs quickly and without warning, often leaving individuals feeling helpless and out of control. This loss of control is a significant factor in the development of conditions like PTSD, as it shakes the foundational belief in one's ability to protect oneself and others.[40] This is especially true for those who witness the arrest and have to take action to save their loved ones life. As a result, we saw participants describe the weight of the responsibility for the outcome or not knowing if what they did contributed to a negative outcome (theme 1) and the need to be with their loved ones at all times (theme 2). Some individuals may clearly display criteria associated with clinically diagnosed PTSD, but many more individuals will exhibit resilient responses or brief subclinical symptoms or consequences that fall outside of diagnostic criteria.[41] The resilience often exhibited by this group, and the immediate need to assume a caregiver role for their survivor, shows up in the delayed realization of their own trauma as shown in theme 4. This may in fact be a level of dissociation for their won survival but often means that the trauma and residual effects of witnessing a loved ones sudden death is overlooked or misunderstood as described in theme 6.

To understand what trauma does, we have to understand what it is. Lenore Terr, a child psychiatrist, who did the first longitudinal study of traumatized children writes, "*psychic trauma occurs when a sudden, unexpected, overwhelming intense emotional blow or a series of blows assaults the person from outside. Traumatic events are external, but they quickly become incorporated into the mind*".[42] Thus, it is not the objective circumstances that determine whether an event is traumatic, but the subjective emotional experience of the event.[42] This is why we have chosen to begin to normalize the language of trauma from cardiac arrest in this paper to bring attention to the importance of the nuanced experience this group has – family members who witness the arrest – that is different than others. The entire experience of having a loved one suffer a life-threatening cardiac event is traumatic for all involved. however, for those that bear witness to the initial arrest and in many cases provide life-saving resuscitation, the replay of events and situational triggers in their mind which come with seeing their loved one suddenly collapse, be unresponsive and effectively 'die' are unavoidable. Recognizing how the witness context can add additional harmful layers to their lived experience is absolutely crucial in understanding how to build a care pathway to support their unique recovery needs.

Despite growing literature on lay responder experience in cardiac arrest (often focused on strangers helping in public cardiac arrests)[43] and family member experience of cardiac arrest, the topic of the impact of family members as witnesses and in many cases the first lay responders has not been teased out in research to date. The existing resuscitation research on family member experience largely focuses on the burden of the unanticipated life changes and caregiving role of spouses and other loved ones in post-acute care periods of survivorship.[44] In fact, it is challenging to find a wider literature in any field to align with, other than the general understandings of the science of psychological trauma (PT). In that sense, our findings are congruent with descriptions of how PT typically manifests including three sets of symptoms: (1) physical symptoms due to physiological arousal, such as hypervigilance and exaggerated startle response; (2) intrusive symptoms that are comprised of memories of the event; and (3) avoidant symptoms where the victim actively avoids the site of the critical incident, avoids discussing it, and in time has a reduced interest in significant life activities.[45] If these disruptions are not treated, signs of PTSD emerge after as little as 30 days.[45]

This paper serves as a call to action for the resuscitation community to pay closer attention to the unique trauma faced by family member responders. Our participants provided very concrete ideas on this (Table 3), including re-examining how we communicate the reality of cardiac arrest especially during CPR training, how we prepare the professional response team, and developing support mechanisms. Much like the work that has been done in treating psychological trauma,[46] the way forward will need to be multimodal and longitudinal, from the time immediately following the base trauma and throughout the recovery journey to adequately address the care needs of these ‘co-survivors’.

Strengths and limitations of the study

As with all qualitative research, there is an element of volunteer bias that is inevitable; those who did not participate may have had a systematically different experience from those who participated in some way. To minimize the impact of this, we employed rigorous qualitative methods, recruited participants from a variety of sources and interviewed until we felt thematic saturation had been reached.

In addition, we did not have any volunteer participants whose loved one did not survive their cardiac arrest. This was not by design but by happenstance and as such we were not able to look at the potential influence of other psychologic impacts that would come with that experience such as grief, responsibility for the outcome of death, etc. We believe this to be yet another nuanced layer of the trauma pathway that certainly deserves further investigation and understanding in future research.

We were only able to conduct data collection in English owing to resource issues, and so therefore we cannot account for any difference in the experiences of family members who cannot communicate in English. This is an important area for future research given that cardiac arrest can happen to anyone.

Conclusion

There is increasing research evidence that family members of OHCA survivors have their own challenges as part of the recovery journey. We take this understanding a step further and present the novel concept of the compounded impact of initial base trauma many spouses/family members have of witnessing and responding to the initial arrest itself. The nuanced experiences of this unique subset of bystanders points to the need to normalize their experience as a trauma. Early recognition and tailored support for the potential drivers of their increased distress and anxiety would be very helpful in reducing the psychologic sequalae common to this group.

CRediT authorship contribution statement

Katie N. Dainty: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Krystle Amog:** Writing – review & editing, Formal analysis, Data curation. **Sachin Agarwal:** Writing – review & editing, Resources, Data curation. **M. Bianca Seaton:** Writing – review & editing, Project administration, Methodology, Formal analysis, Data curation, Conceptualization.

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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.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.resplu.2025.100944.

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