

Out of hospital cardiac arrest; the experiences of known bystanders – A scoping review and narrative synthesis.

Abstract

Background: Cardiovascular disease (CVD) is the major cause of death in adults, with cardiac arrest and sudden death due to coronary ischaemia the primary single cause. Around 90% of cardiac arrests occur either at home or in the workplace. The provision of bystander cardiopulmonary resuscitation (CPR) is associated with a three-fold increase in survival. However, the effects on bystanders are frequently neglected, with the emotional and psychological consequences being particularly pronounced when the casualty is known to the rescuers. **Aims:** To synthesise the available literature exploring bystander experience post cardiac arrest, with particular emphasis on bystanders known to the casualty. **Methods:**

A scoping review was undertaken in line with Joanna Briggs Institute guidance. A search strategy was developed for three online databases, Cinahl, Scopus and Medline alongside a grey literature review (as standard for a scoping review) with the search undertaken on the 05.05.2024. Two reviewers independently assessed all articles for inclusion and extracted relevant study information. **Findings:** The findings of 12 articles are presented in three categories: response dynamics, encompassing the immediate reactions and decision-making processes; emotional fallout, addressing the long-term psychological and emotional impacts; and moving on, examining the requirements for both practical and emotional support in the aftermath of the event. **Conclusion:** There is limited literature exploring the needs of families following observation or involvement in the resuscitation of a known casualty. Whilst the emotional and psychological impact is clearly significant, there is currently no structured

support system available following the event. The need for ongoing support and care for families is highlighted.

Keywords

Bystanders, Relative trauma, Out of Hospital Cardiac Arrest, Cardiopulmonary resuscitation, Heart Arrest.

Key points

- Cardiovascular disease resulting in cardiac arrest is the primary single cause of death, with out of hospital arrests accounting for around 90% of such events.
- Bystander CPR gives potential for psychological distress that may result in ongoing care needs.
- Need for post event care of bystanders is significant, but no structured support systems are available.
- Further research into the experience of known bystanders is required, in particular, around development of appropriate support systems.

Reflective questions

- 1) Have you witnessed relative trauma following a cardiac arrest of someone known to them, and how did that impact you?
- 2) Do you feel able to provide adequate support for distressed relatives of OHCA patients?
- 3) Do you feel the public are adequately prepared for the short- and long-term personal impact of performing CPR?

Introduction

This article sets out to explore the available evidence around the psychological impact and support requirements for bystanders who performed cardiopulmonary resuscitation in out of hospital environments. In particular, we focus on the impact on bystanders who are known to the patient, where the psychological impact is likely to be the most acute.

Cardiac arrest is a medical emergency characterized by the cessation of heart activity leading to the interruption of blood flow to organs. Without prompt medical intervention, this condition invariably results in death. CPR consists of artificial ventilation and chest compressions and aims to maintain perfusion of vital organs during cardiac arrest (Olasveengen et al., 2021). Early CPR is a vital link in the chain of survival (Semeraro et al., 2021) and is associated with improved mortality and better neurological outcomes (Cournoyer et al., 2023). However, whilst half of all OHCA events are witnessed by a bystander, CPR is only attempted in seven out of ten cases (Perkins et al., 2021).

Cardiovascular disease (CVD) is the major cause of death in adults, with cardiac arrest and sudden death due to coronary ischaemia the primary single cause (Gräsner and Bossaert, 2013; Kumar et al., 2021). Around 90% of cardiac arrests occur either at home or in the workplace (Perkins et al., 2021). Across Europe, the annual incidence of out of hospital cardiac arrests (OHCA) is estimated to be between 55-170 per 100,000 people (Gräsner et al., 2021; Perkins et al., 2021).

Men are more at risk of sudden cardiac arrest than women (Böckler et al., 2024), yet overall discharge survival rate of women is lower than that of men, and women face poorer neurological outcomes (Lei et al., 2020). In part, this is likely to relate to pathophysiological

characteristics such as underlying disease, and demographics such as age at time of arrest (Mody et al., 2021). However, recent studies highlight a statistically significant difference in bystander intervention, with fewer women receiving bystander CPR than men (49.1% versus 54.9%) (Mody et al., 2021; Shelton et al., 2024).

The provision of bystander CPR is associated with a three-fold increase in survival from OHCA (Hasselqvist-Ax et al., 2015). Nonetheless, outcomes generally remain poor, with survival to hospital discharge of around nine percent, when resuscitation has been attempted (Perkins et al., 2021). Whilst there is a clear drive to improve bystander engagement with CPR (Rea et al., 2021), much less work has focused on the support for possible emotional or psychological consequences.

(Olasveengen et al., 2021; Perkins et al., 2021; Semeraro et al., 2021; Cournoyer et al., 2023)

Witnessing a cardiac arrest is a traumatic event (Dainty et al., 2022), with the impact of attending to a family member or friend likely to be particularly harrowing. The ongoing psychological implications should not be underestimated, with reports of long-term mental health problems including post-traumatic stress disorder (PTSD) (Douma et al., 2021; Bradfield et al., 2024). Whilst there is some evidence exploring the psychological and behavioural factors influencing bystander engagement in CPR, much of this is of weak quality and variable design (Farquharson et al., 2023). However, barriers including perceptions of lack of capability, uncertainty about when CPR is appropriate, feelings of unpreparedness as well as fear of doing harm have been identified (Farquharson et al., 2023a). In addition, the emotiveness of the situation has been highlighted as a single factor that impacts on avoidance of undertaking CPR (Riou et al., 2020). This is likely to be heightened when the patient is known to the person

witnessing the event. This review therefore aimed to narrow the focus to this group specifically, allowing us to engage in a more nuanced exploration of their specific needs.

Methods

A scoping review was conducted to identify and examine the published studies and grey literature around the psychological impact and support for “known bystanders”. This group include family, friends and colleagues who know the patient. The Joanna Briggs Institute guidelines were used to structure the review (Aromataris, Munn and Tufanaru, 2020).

Scoping reviews are a form of evidence synthesis designed to systematically identify and map the extent of available evidence on a specific topic, field, concept, or issue (Munn et al., 2022). They are intended to provide an overview on the general evidence available on a topic rather than a more specific systematic review (Peters et al., 2020). Alongside their increasing popularity has come calls for improving methodological and reporting quality, with the recent publication of the PRISMA ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Scoping Review Extension) providing a quality framework (Tricco et al., 2018)

Search strategy

The preliminary search was conducted in three databases; CINAHL (Cumulative Index to Nursing and Allied Health Literature) (CINAHL:), Scopus;(Scopus, (n.d.).) and Medline (MEDLINE, (n.d.)) on 05/05/2024. This combination reduces the risk of inclusion of predatory articles/journals (Oermann et al., 2021) whilst ensuring comprehensive and specialised sources (Hopia, Latvala and Liimatainen, 2016). The reference lists of included articles were hand screened to identify additional studies. A PPC (population, concept, context) framework was used to structure and identify key search terms to ensure the appropriate data was captured (Hosseini et al., 2024). The basic search strategy was completed using terms “Out of

Hospital” AND “Cardiac arrest” AND “experience” using MeSH (Medical Subject Heading) terms and keywords appropriate to each database, see below for full search terms used.

PCC Framework

Population	Concept	Context
Community	Cardiac arrest	Experience
Out of hospital	Resuscitation	Perspective
Public	Cardiopulmonary arrest	
Bystander	Respiratory arrest	
Key supporter	Circulatory arrest	
Co-survivor	Cardiac death	
	Heart arrest	

No date restrictions were imposed. However, due to funding restrictions, only articles in the English language were included. The search was designed to be broad to ensure all relevant articles were identified.

Inclusion and exclusion criteria

Literature was included in this scoping review if they met the following inclusion criteria:

- Any study reporting evidence of psychological impact or needs of known bystanders, regardless of study design.
- Studies reporting within the UK and other comparable high-income countries.
- Studies published in English.
- Studies reported since inception of database until present.

Exclusion criteria:

- Studies reporting outcomes of medical interventions in CPR,
- Studies examining medical perspectives on CPR,
- Studies focusing on public training or willingness to start CPR,
- And studies exploring survivor experience
- Hypothetical responses

Data extraction

Double data extraction was performed by two reviewers (MV, LM) independently to ensure consistency. Any disagreements were settled by a third reviewer (RL). The data was then charted into a tool developed by the reviewers (LM, MV). See supplemental table 1. The study findings were then synthesised and presented as a narrative synthesis. The results are reported in full and presented in the PRISMA ScR flow diagram below (diagram 1). The initial search identified 2,888 titles. A total of 1,336 duplicates were removed and a further 21 articles excluded as the full text was not available in English. A further article was found from another source. In total, 1,532 titles and abstracts were examined. Of these, 1,480 articles were excluded. The remaining 52 full text articles were examined against the inclusion and exclusion criteria, with a final 12 articles meeting the criteria for inclusion in the scoping review. Themes were then systematically identified, analyzed, and integrated across the studies to generate broader insights and deeper understanding of the topic. Patterns and key concepts were identified, enabling a comprehensive narrative to be created, capturing the collective findings and implications.

Quality

No studies were excluded based on their quality, but the narrative synthesis will reflect on the quality of the identified studies.

Findings

A total of twelve articles were included in the review (See supplementary table 1). The studies were published between 1996 and 2024 and conducted across six countries, with the majority originating from Scandinavia (n=7), with the others from Germany (n=2), Australia (n=1) and the United Kingdom (n=2). The studies were heterogenous in approach and included: qualitative interview-based studies (n=8), mixed methods (n=2) and two quantitative studies: a descriptive survey design study (n=1) and secondary analysis of database (n=1). Sample sizes varied between seven and 745, with samples reflective of the methodological approach selected. All samples included some participants who had witnessed and engaged in CPR as a known bystander. Findings are reflective specifically of this cohort.

Quality of the studies included was good. The appropriate Critical Appraisal Skills Programme (CASP) tool was used to review each article. Potential issues around the impact of recruitment on the sample population were identified in a number of the studies. These are highlighted in supplementary table 1.

The findings are presented as three themes: response dynamics, capturing the immediate response and decision-making; emotional fallout, highlighting the long term psychological and emotional effects; and moving on, exploring the needs for practical and emotional support following the event.

Response dynamics

The critical moments during a cardiac arrest event require rapid decision-making with bystanders facing intense pressure to act quickly whilst confronted with the possibility of bereavement (Larsen et al., 2023). This theme explores how individuals perceive their role and the split-second decisions they make in the face of a life-threatening emergency. The shock of witnessing a loved one collapse, and the subsequent adrenaline rush can profoundly impact their emotional state, both during and after the event. Whilst all studies highlighted the intense emotions surrounding the sudden cardiac arrest of a loved one, five articles provided in-depth insight into “response dynamics” (Bremer, Dahlberg and Sandman, 2009; Thorén et al., 2010; Whitehead et al., 2020; Larsen et al., 2023; Beck et al., 2024).

An overwhelming sense of loss of control, incompetence and frustration are common (Bremer, Dahlberg and Sandman, 2009; Larsen et al., 2023; Beck et al., 2024), with bystanders often experiencing feelings of altered reality and overwhelming ethical responsibility (Bremer, Dahlberg and Sandman, 2009; Whitehead et al., 2020). This intense emotional turmoil and the traumatic nature of witnessing a loved one experience cardiac arrest (Thorén et al., 2010) is heightened as they are confronted with the possibility of bereavement (Larsen et al., 2023). This can lead to a sense of inadequacy in their ability to provide assistance (Bremer, Dahlberg and Sandman, 2009). However, the arrival of emergency personnel instils hope, and for some, compensates for the bystander's perceived inadequacies in their ability to do something to help (Bremer, Dahlberg and Sandman, 2009). Whilst care for themselves is rarely perceived as a necessity (Whitehead et al., 2020), actions to reducing this acute stress response have been suggested as a mechanism to help mitigate the risk of developing PTSD (Beck et al., 2024). For example, acknowledging the bystander's stress, particularly by first responders, has the potential to be a simple, yet valuable intervention (Beck et al., 2024). While it may be

impossible to be emotionally prepared for such events, practical preparedness can be achieved (Bremer, Dahlberg and Sandman, 2009), with suggestions to include emotional implications potentially integrated into CPR courses (Beck et al., 2024).

Emotional fallout

The psychological aftermath of performing CPR can include a wide range of emotions such as relief, guilt, and anxiety (Mion et al., 2021). Bystanders may struggle with the outcome, especially if the person does not survive, leading to feelings of helplessness or self-doubt (Bremer, Dahlberg and Sandman, 2009). Beyond the immediate emotional response, bystanders can experience long-term psychological effects such as acute stress disorder or post-traumatic stress disorder (PTSD) (Case et al., 2021). Access to psychological support and counselling can be critical in helping individuals process and cope with these experiences. The theme of “emotional fallout” was identified in five of the articles (Weslien et al., 2005; Møller et al., 2014; Mathiesen et al., 2016; Brinkrolf et al., 2021; Mion et al., 2021). The studies collectively highlighted the significant emotional and psychological burdens borne by family members. Whilst the reported prevalence of psychological injury varied widely, from 95% (Mion et al., 2021) to 33% (Brinkrolf et al., 2021), this is likely to reflect differences in study samples and definitions of psychological sequelae.

Post-event a range of mental health problems were identified, including, anxiety, poor sleep, feelings of guilt, hyper-vigilance (Mion et al., 2021) flashbacks, nightmares, and intrusive images (Mathiesen et al., 2016). These symptoms varied in duration, lasting from days to months or even years (Mathiesen et al., 2016). Predicting the impact on known bystanders

remains challenging, with no statistical difference between individual characteristics of bystanders and the psychological impact (Brinkrolf et al., 2021).

The need to request support was identified as a barrier to accessing help by many known bystanders (Møller et al., 2014). For those who had engaged in an attempt to resuscitate their loved one, reassurance they had performed optimally was found to be beneficial (Brinkrolf et al., 2021). Furthermore, where the dispatcher had provided instructions for CPR, risk of psychological sequelae was significantly less compared to cases without telephone-CPR. This was also reflected in the cohort of bystanders who had attempted resuscitation compared to those who did not (Brinkrolf et al., 2021).

Moving on

Seven of the articles were included in the theme of moving on, addressing the aftermath of cardiac arrest events and the struggles faced by both families and survivors in understanding and supporting each other moving on from the cardiac arrest event (Axelsson et al., 1996; Bremer, Dahlberg and Sandman, 2009; Møller et al., 2014; Mathiesen et al., 2016; Case et al., 2021; Mion et al., 2021; Beck et al., 2024). The emotional turmoil experienced by survivors and their families often leaves both families and survivors struggling to understand and support each other in the aftermath (Case et al., 2021). This can be exacerbated by the many questions left unanswered (Møller et al., 2014), with many survivors and families highlighting the inadequate nature of post-arrest support (Case et al., 2021).

Whilst the literature highlights the need for bystanders to access support, with many expressing a strong need to talk about their experiences, they face significant barriers (Bremer, Dahlberg and Sandman, 2009; Mion et al., 2021). One study suggests that less than 30% of

those who reported ongoing psychological difficulties were able to access support (Mion et al., 2021). Structured follow-up may mitigate concerns and adverse reactions, suggesting that organized post-event support should be provided through a formal platform (Mathiesen et al., 2016). Offering, as opposed to being required to request, support, has been suggested as an effect mechanism to avoid some of these barriers (Møller et al., 2014).

In the context of CPR training, the evidence suggests that individuals need preparation beyond the technical aspects (Axelsson et al., 1996; Brinkrolf et al., 2021). Well-designed CPR training programs incorporating realistic scenarios not only reduce anxiety but also enhance performance during actual emergencies (Beck et al., 2024). However, the effectiveness of CPR training depends on skill retention over time, necessitating regular refresher courses and continued education.

Relatives are significantly impacted by out-of-hospital cardiac arrests (Larsen et al., 2023) and struggle to adapt to life afterward, highlighting the need for a new family-centered support approach. Many describe the incident as life-altering, experiencing long lasting emotional and social challenges (Mathiesen et al., 2016).

Discussion

With just under 90% of cardiac arrests occurring out of hospital; 72% at home, and 15% in the work environment (Perkins et al., 2021), family members are the most likely witnesses (Thorén et al., 2010). The significant psychological impact should not be underestimated, yet few interventions exist to support these individuals after the event (Rojas et al., 2023). The emotional and psychological trajectories differ between individuals, with factors including:

event outcome, CPR duration, attitude of the clinical team, and lack of debriefing, predictors of a negative psychological reaction (Axelsson et al., 1998).

The actions of healthcare professionals have a potentially significant impact on family during this traumatic experience, whether that be acutely in the community or during following interactions. Families have identified that the heightened awareness created by the event result in comments overheard from medical professionals have stuck with them and been recalled for years (Weslien et al., 2005). Others suggest their emotional needs are not acknowledged by healthcare professionals (Southern et al., 2024), leaving them as a 'forgotten patient' (Bradfield et al., 2024). As healthcare professionals, it is essential to remain mindful of this issue, as it can be easily overlooked, particularly when the patient survives.

Research indicates that regions with lower rates of CPR training exhibit correspondingly lower rates of bystander-initiated resuscitation (Bray et al., 2017). This correlation underscores the critical importance of widespread and accessible CPR training programs in order to improve emergency response outcomes. However, for those family members who had received training, and subsequently initiated CPR, certain aspects of rescue reality differed significantly from their training and expectations. In particular bystanders suggest that they experience difficulties in determining depth of chest compression, as well as managing uncertainties associated with a real emergency situations including aspects such as patient appearance (Chen et al., 2020). Whether bystanders 'appropriately' performed CPR often depended on how they were able to manage their stress response (Beck et al., 2024). The need for emotional preparedness to initiate CPR is clear, yet current basic life support training does not prepare for these aspects. Consideration should therefore be given to how we incorporate these elements without inadvertently creating stress.

Disparities surrounding victim gender are well documented, with CPR less likely to be initiated on a female who collapses (Blewer et al., 2018). Perceptions concerning the discrepancy in bystander CPR initiated on women versus men differ based on the gender of the rescuer, with male rescuers expressing apprehensions about potential accusations of sexual assault, harassment, or inappropriate contact. Conversely, female rescuers might hesitate due to concerns about inflicting physical harm (Shelton et al., 2024). Whilst further research is required to gain a better understanding of the influencing factors (Dainty et al., 2024), particular consideration around gender inequalities are warranted. In addition, CPR training is most likely to involve the use of a male mannequin (Jarman et al., 2019). With a correlation between prior experience of CPR training and likelihood of performing bystander CPR (Matsuyama et al., 2020) consideration needs to be given to widening experiences in order to start addressing this inequality.

Limitations

The inclusion of a wide range of study designs and methodologies may lead to variability in the quality of the evidence. As a scoping review does not include a formal assessment of the quality of the included studies, this may affect the reliability and validity of the conclusions drawn. The comprehensiveness of the literature search was constrained by language restrictions, potentially missing relevant studies. In addition, with much of the literature derived from outside the UK, contextual issues including social attitudes, cannot be accounted for within the review.

Conclusion

Witnessing an OHCA is a traumatic event, which may be more emotionally charged when a loved one is involved. Bystander CPR gives potential for psychological distress that may result in ongoing care needs. Whilst the public message continues to encourage the initiation of early bystander there should be the appropriate mental health support for providers after the event. Further research into the experience of known bystanders is required, in particular, around development of appropriate support systems.

Conflict of interest

The authors declare they have no financial or personal conflicts of interest.

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