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Title: The lived experience of rescuing people who have driven into floodwater : understanding challenges and identifying areas for providing support

Year: 2019

Version: Accepted version (Final draft)

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Please cite the original version:

Keech, J. J., Smith, S. R., Peden, A. E., Hagger, M., & Hamilton, K. (2019). The lived experience of rescuing people who have driven into floodwater : understanding challenges and identifying areas for providing support. *Health Promotion Journal of Australia*, 30(2), 252-257.
<https://doi.org/10.1002/hpja.181>

The lived experience of rescuing people who have driven into floodwater: Understanding challenges and identifying areas for providing support

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Full citation:

Keech, J.J., Smith, S.R., Peden, A.E., Hagger, M.S. & Hamilton, K. (in press). The lived experience of rescuing people who have driven into floodwater: Understanding challenges and identifying areas for providing support. *Health Promotion Journal of Australia*. doi: 10.1002/hpja.181

The article will be published in final form at doi.org/10.1002/hpja.181

Abstract

Background: Drowning is a major public health issue, with risk increasing during times of flood. Driving through floodwater is a major risk factor for flood-related drowning and injury, and despite widespread public health campaigns, many people continue to undertake this risky behaviour and require rescue.

Purpose: We aimed to identify key challenges faced by emergency services personnel when rescuing those who have driven into floodwater, and to identify strategies for supporting rescuers in this important role.

Methods: Australian flood rescue operators ($N=8$) who had previously rescued a driver who had driven through floodwater, participated in semi-structured interviews. Data were analysed using thematic analysis.

Results: Four challenges emerged from their experiences: Involvement of untrained personnel, varying information provided by emergency telephone operators, behaviour of drivers complicating the rescue, people sightseeing floods or flood rescues, or ignoring closed roads providing sources of distraction and frustration.

Conclusions: We propose five strategies for translating these results into practice, including: training and protocol development for (1) emergency personnel and (2) telephone operators, (3) training for rescuers regarding non-compliant rescuees, (4) educating the public, and (5) increasing compliance with closed roads. Current findings provide valuable insights into how rescuers can be supported in performing their roles, and implementation of these strategies has the potential to reduce fatalities occurring due to driving through floodwater.

So what? The strategies presented have the potential to reduce the frequency and improve the outcomes of floodwater rescues, aiding in the prevention of injury and death.

Keywords: Injury, Qualitative methods, evaluation methods, workplaces

Introduction

Drowning is the leading cause of death during times of flood ^{1,2}. Globally, floods are estimated to have claimed the lives of 500,000 people between 1980 and 2009 ³. Driving into floodwater is a leading activity prior to flood-related drowning ⁴ and has been the subject of mass media drowning prevention campaigns (e.g. ‘Turn Around Don’t Drown’ ⁵ and ‘If it’s flooded, forget it’ ⁶). In Australia, there are an average of 282 unintentional fatal drownings each year ⁷, of which an average of 13 are flood-related, commonly due to driving into floodwater ⁸. Many more people each year are saved from drowning by flood rescue operators in Australia, commonly volunteers from State or Territory Emergency Services (SES) ⁹. In each state and territory of Australia, the State Emergency Service is the primary responder for storm and flood events, with the role of providing rescue to drivers in flood events. In some localities, this responsibility is shared with fire departments such as Queensland Fire and Emergency Services (QFES). These personnel play an important role in public safety during severe weather events, and are frequently called upon when motorists become stranded while driving into floodwater. For example, during a severe weather event in March 2017, in a 24-hour period, 108 floodwater rescues were conducted in Queensland, Australia by the SES ¹⁰.

Previous research has examined the motives associated with intentionally driving into floodwater ¹¹⁻¹³. Research shows that drivers hold normative beliefs that underpin their decision to drive into floodwater, including the presence of others who may be available to assist if required, such as family members, police and the SES ¹⁴. Given that fatality and rescue statistics indicate that people continue to drive into floodwater, and that recent research has identified that some risk-taking may occur due to the perceived availability of rescue resources, identifying areas for supporting rescuers is vital to explore. Through an analysis of the lived experiences of flood rescue operators who have rescued those who have driven into floodwater, we aimed to: (1) identify key challenges faced by flood rescue operators and (2) identify targets for supporting flood rescue operators.

Methods

Participants

Participants were male (flood rescue operators, swift water technicians, firefighters with swift water rescue training; $N = 8$) who had been involved in the rescue of at least one person who had driven into floodwater. Five participants were employed by or volunteered with New South Wales SES, one for the Northern Territory Fire and Rescue Service, and two for QFES. Participants were engaged in either a paid role, a volunteer role, or a combination of paid and volunteer engagement. Two of the participants were involved in training and educating flood rescue and swift water technicians. The participants ranged in age from 22 to 48 ($M = 36.50$; $SD = 9.20$), with between 5 and 27 years of experience in their role ($M = 13.71$; $SD = 8.62$) and were recruited using internet and email advertisements and snowball sampling.

Design and Procedure

The current study utilised semi-structured qualitative interviews to understand the experiences of rescuers. Questions were designed to stimulate discussion around the common circumstances leading to a driver requiring rescue from floodwater. The rescuers were free to speak at length with minimal interruption other than prompting for clarification. Author 1, who is a researcher trained in qualitative methods, conducted the interviews by telephone. Interview time ranged from 1 to 2 hours. Interviews were audio-recorded and transcribed verbatim. A reflexive journal was kept to reflect on researcher assumptions and maintain transparency in analysis^{15, 16}. The study received ethical approval from the University Human Research Ethics Committee (reference # PSY/A9/15/HREC).

Interview Guide

The interviews were guided by a series of broad open-ended questions designed to stimulate the flood rescue operators to provide a rich, detailed, and self-directed description of their experience. First, the interviewer asked, “What information are you aware of regarding the risks of driving through flooded waterways?” In order to invite a broad summary of their experiences with

rescuing drivers who have driven into floodwater, the interviewer asked, “In your experience, can you tell me about the common circumstances that led up to the rescue of people driving through floodwater?” Thirdly, the interviewer invited description on the specific experiences, prompting for their thoughts about the situation and reactions of the people they rescue, “Can you now tell me about the rescues you’ve experienced?” Fourth, the interviewer asked, “How have these experiences shaped your beliefs about driving through floodwater and the people who have engaged in such acts?” Fifth, the interviewer asked, “With your experience, what messages would you pass on to other people about driving through flooded waterways?” Finally, participants were invited to share any information about their experiences they feel had been missed.

Analysis

As the aim of the current research was to allow themes to form based on individuals’ descriptions of their experiences, thematic analysis based in an inductive interpretivist approach was used to interpret the data ^{15, 16}. We followed the six steps prescribed by Braun and Clarke ^{15, 16}. First, transcripts were read and re-read to ensure familiarity with the data by Author 2. Second, 100% of the data were identified and coded systematically in relation to the research questions using NVivo 11 by Author 2. Development of the coding-scheme was data-driven, with no codes specified *a priori*. To ensure stability of coding and to enhance trustworthiness, Author 1 co-coded 12.5% of the data. Codes were collated inductively into potential themes. Using an iterative process ¹⁷, themes were reviewed with reference to the interview transcripts to ensure they reflected their original context. Themes were then reviewed, refined, and named by Author 1, 2 and 5. Finally, themes were reported and verbatim quotes were included to demonstrate contextual significance.

Results and Discussion

In this section, we present four key challenges that emerged as themes from the rescuers’ descriptions of their experiences. Drawing upon rescuer descriptions and on theory and empirical evidence from behavioural science, we have suggested the implementation of five strategies to assist rescuers in navigating the identified challenges.

Challenges

Challenge 1: The involvement of untrained personnel. Three of the rescuers described situations where emergency services personnel (police officers and firefighters) who had not received training specific to conducting a rescue of motorists stranded in flooded waterways became involved in rescues unnecessarily, exacerbating the situation. One rescuer described a situation where police attempted to execute the rescue before the SES arrived, “The police vehicle got there first, it entered the water trying to execute a rescue, then got stuck as well. They should have known better. They knew we were on our way” - *P04*. Another rescuer described police attending the scene of a rescue and entering the floodwater while the rescue was being conducted, “As this rescue was being undertaken, at the very same site, a police car that was responding to the scene arrived and proceeded to drive their little sedan into floodwater...and our operators then had to conduct the rescue there, which due to the location of the vehicle, and the potential for the vehicle to be pushed sideways, took quite a bit longer...that’s of major concern because there was no reason for the police to have to drive into the floodwater there... It just meant that we had to put more and more resources into that area when we had other rescues going on” - *P05*. The same rescuer described firefighting jackets as incompatible with conducting a water rescue, “The bulk of the fire rescue guys, they’ll rock up at a rescue and they’re wearing their firefighting jacket, which is extremely heavy and they go walking straight into the floodwater and you know, they’re basically wearing a weight vest as a result”. Another rescuer described additional rescues that arise due to rescue attempts by untrained personnel, “You may have the local police officer, some local fire who aren’t trained. And what causes me concern as well is I’m there to rescue the person out of the car but I’m also there to rescue the police officer and the fire fighters and that because they will want to jump in that water and rescue that person...And a lot of times going through my head is that you get called to a person, or a person in floodwater and quite often by the time you get there there’s three people in floodwater. Because there’s people on the side that have attempted to go and rescue and now they’re in trouble” - *P06*. The rescuer described that due to the issues above, there are

challenges in preventing untrained personnel from becoming too involved in assisting a rescue, “So as much as you focus on the victim and the situation and the scenario, it’s all the people that turn up at that incident as well that you’re actively trying not to get too involved because it can be harmful to the outcome” - *P06*.

Challenge 2: Information provided by emergency telephone operators varies between rescues. One rescuer described that there appears to be considerable variation in the advice given to motorists stranded in floodwater when they dial the Australian emergency telephone number (000). “When they pick up their mobile phone and say I’m in a car. I’m in floodwater and my car has just gone off the causeway what do I do? We don’t have a unified approach as such which I think we are getting to. Some people may say get out of the vehicle, you know, windows up, windows down, kids, seat belts, weight of the vehicle, wait for emergency services all that sort of thing.” - *P06*. The same rescuer also described that there were differences in the department (i.e. police, fire brigade) that these types of calls are directed to, “When you call 000 say in NSW and you say I’m trapped in a car, you automatically go to the police, the RCO, rescue coordinating officer. And he may take that call or it may go to the say the fire brigade because they’re the rescue agency. But there’s no standard guidelines and this would be beneficial that one day we may sort of land on this.” - *P06*.

Challenge 3: Behaviour of rescuees complicating the rescue. One rescuer described the challenging and time-consuming process that occurs when drivers are resistant to being rescued. For example, “I have seen that people will become combative even in waist deep water. People will panic and become combative and they’ll also become you know argumentative about they’ll get halfway and forget that they’ve got their handbag in the car or something like that.” - *P06*. Another rescuer described a situation where a driver resisting rescue resulted in a six-hour standoff, using a considerable amount of resources and occurring due to a miscommunication, “Once we actually got him out, all he was waiting for was the water to drop to his knee height so he could walk out and didn’t want any rescuers to put themselves in danger by coming into the water...the helicopter sat on the ground for an hour and a half, two hours while we were trying to talk to this guy.” - *P07*.

Two rescuers also described difficulty and frustration with people driving into floodwater with children or elderly people in the car due to the added difficulty in rescuing them. For example, “And especially children or the elderly, they are a very difficult person to rescue. In flood rescue there’s a large element of ownership given back to the victim from the bank. We send out a life jacket, we ask them to put it on, we can even ask them to tie off the vehicle. And with children or the elderly obviously we can’t ask them to do that or we can’t guarantee that they’ve put a life jacket on properly before we send a rescuer out to them.” - P06.

Challenge 4: Behaviour by members of the public a source of distraction and frustration. Particular behaviours by members of the public have been described by rescuers as sources of distraction and frustration during rescues, and as having the potential to lead to further rescues. The first example of this described by a rescuer was members of the public trying to spectate the rescue or the floodwater itself, “The frustrating thing about that is that, while we obviously had a deceased man there, we had spectators, local residents, that had their four-wheel drives and they were driving around in the floodwater, trying to get a view on what we were doing... they were interfering with our job, and you know, making us more concerned about what they were doing as well... If we’re standing there conducting a rescue, and a vehicle drives straight past us through the water, we’ve got absolutely no power to stop the people doing that. So yeah, it feels like we’re a little bit hamstrung.” - P02. The second example is the common experience of having to rescue those who have ignored road closed signs or SES vehicles being used to obstruct the road, and also feeling ‘hamstrung’ when observing drivers do this before getting in to trouble, “The biggest frustration I guess, from a rescuer's perspective is when they've driven around a road closed sign.” - P06; “Even with our SES vehicle parked sideways, attempting to block the road, before further assistance can arrive, flashing lights and parked sideways across the road, the people will still sneak around the back of the vehicle and continue along, and either find themselves in the same position as the others, or be lucky and get through.” - P05.

Recommendations

Strategy 1: Development of training and protocols for non-flood rescue emergency

personnel. In response to Challenge 1, it is important to develop protocols to guide decision-making and training for emergency services personnel not trained in flood rescue who may be called to an incident involving the rescue of motorists who have driven into floodwater.

Specifically, to reduce their risk of exacerbating the situation, requiring rescue themselves, or adding further demands to the rescuers; these personnel require training in effectively managing the scene until flood rescue operators arrive, and to have effective protocols regarding participation in floodwater rescues only to the extent afforded by their training. Protocols are widely used by emergency and healthcare personnel and have been found to be effective in guiding decision-making¹⁸; however, review and revision of protocols is important for maintaining their utility¹⁹.

Clear role delineation is particularly important for effective collaboration between agencies, given the hierarchical structure that personnel are accustomed to within their own agency. A recent qualitative study examining multi-agency coordination among emergency responders identified that role clarity in emergency service providers is often overlooked and that provision of role clarity in these organisations and the way they work together may lead to more effective collaboration²⁰.

Strategy 2: Implementing a standard operating procedure for emergency telephone

operators. In response to Challenge 2, the design and consistent application of a standard operating procedure for emergency telephone operators when speaking to people who have their vehicle stranded in floodwater would be beneficial in that it may reduce rescuee behaviour which increase the risk or complicate the rescue. Quality of telephone operator communication has been found to encourage compliance with operator instructions during telephone triage²², which is an identified issue for healthcare telephone triage on helplines such as the Australian Healthdirect helpline²³. An example in the context of flood rescue is if a vehicle has just submerged into water then protocols such as “seatbelt off, window down, release children, get out”^{19, 21} can be an easy, consistent, and lifesaving message to convey. Expanding upon this simple message is Giesbrecht’s¹⁹ new vehicle submersion emergency dispatch protocol has been developed based on scientific evidence, expert

opinions, experiential observations, and logical decisions. The protocol is a diagrammatic decision-aid containing questions for emergency telephone operators to ask callers and specific instructions that can be provided to assist the caller in a safe evacuation of their vehicle. While the protocol was developed in Canada, its contents are relevant to the Australian context.

Strategy 3. Providing training around strategies for flood rescue operators dealing with non-compliant rescuees. In response to Challenge 3, we suggest that provision of interpersonal communication, conflict management and practical message framing training would be beneficial to flood rescue operators in improving efficiency and reducing resource waste during flood events caused by non-compliant rescuees. An example is the Behavioural Change Stairway Model developed by the FBI's Crisis Negotiation Unit ²⁴. The approach is documented as successful in diffusing a wide range of volatile situations and encompasses communication skills several: active listening, empathy rapport, influence and behavioural change. Training in these communication skills would therefore be likely to improve efficiency and desired outcomes during volatile rescue situations where rescuees are non-compliant with being rescued.

Strategy 4: Educating the public regarding driving to spectate floodwater and flood rescues, compliance during rescues, and passengers that are most challenging to rescue. In response to Challenge 4, we suggest there is a need to develop public health messages aimed at educating the public on three key issues. First, it is important to inform the public that driving around spectating floodwater and flood rescues is a source of distraction, frustration, and increased workload for the rescuers. Second, it is important to provide the public with information regarding the kinds of things rescuers may direct them to do in the event of a rescue, and the consequences of resisting rescue, which include wasting resources and the potential for rescuers to not make it to other rescues while trying to negotiate a hostile situation. The emergency situation itself is likely to trigger emotions that may act as a barrier to effectively receiving information and as such it is likely to be beneficial for the information provided to be familiar ²⁵. Third, the public should be provided information that driving into floodwater when passengers in the car are young, elderly, or have

mobility issues increases the risk, as they are considerably more difficult to rescue. Because prior research has found that drivers can be more willing to enter floodwater when they perceive that rescue is available ¹⁴, this is particularly important. Mass media campaigns are an efficient method for providing messages to large populations, and can produce positive changes or prevent negative changes in health-related behaviours ²⁶. The campaigns are particularly effective in promoting health-protective behaviours when based on theory, compared to atheoretical campaigns ²⁷⁻²⁹. Thus, theory-based mass media campaigns should be utilised for providing this information to the public, to increase the likelihood of translation in to actions.

Strategy 5: Increasing compliance with road closures in floods. Further in response to Challenge 4, we suggest the use of strategies to increase compliance with flooded road closures. The participants suggested strategies including larger financial penalties or consequences for those driving on closed roads, the use of new technologies to block the road such as barricades that respond to rising water, and greater police presence during flood events. Implementing or increasing the severity of fines has been found to provide a deterrence effect for other risky behaviours such as speeding ³⁰, and have also been found to significantly decrease road incidents and fatalities in some instances ³¹. Because the potential to increase police presence at flooded roads is limited, we suggest that installing fixed driver behaviour cameras in flood-prone areas or the use of mobile camera vehicles may be an effective means of deterrence. A recent meta-analysis found that fixed speed cameras which are visible and signposted deliver a considerable reduction in speed and both fatal and non-fatal crashes ³². An earlier Cochrane review also found crash reductions between 8% and 49% in the vicinity of speed camera sites ³³. Thus, we anticipate that clearly visible driver behaviour cameras fixed to road closed signs with clearly signposted penalties would have an effect on reducing the number of motorists ignoring these signs and proceeding into floodwater.

Conclusion

The current study identified four key challenges and proposed five key strategies for supporting rescuers in their challenging roles and improving public safety. These findings provide

valuable information which can inform policy, research and practice aimed at improving public and rescuer safety during severe weather events. While this study is the first to examine the lived experience of flood rescue operators when rescuing those who have driven into floodwater, it cannot necessarily be generalized to all public safety organisations and rescuers. Future research should therefore consider the perspectives of other emergency responders and public safety organisations.

Competing Interest Statement: The authors declare that they have no competing interests.

Acknowledgments and Funding: We thank our study participants for their valuable time. The research was funded by a Royal Life Saving Society - Australia grant. Research at the Royal Life Saving Society - Australia is supported by the Australian Government. The sponsor had no role in the design, methods, participant recruitment, data collection, analysis, preparation of this manuscript, or the decision to submit this article for publication.

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