

Bystander Experiences at and after a Motor Vehicle Accident: A review of the literature

Anna Hall BN, Karen Wotton PhD, Alison Hutton PhD

Affiliation:

School of Nursing and Midwifery, Flinders University, GPO Box 2100, Adelaide, South Australia, Australia.

ABSTRACT

Background

To explore what was known about the experiences of bystanders both at the scene, and following a motor vehicle accident (MVA). Understanding these experiences will further elucidate the knowledge underpinning bystander's action and their needs at the scene and in the hours, days, weeks and months following this event.

Methods

A search of Cumulative Index to Nursing and Allied Health Literature (CINAHL), MedLine (OVID) and Informit was undertaken using a combination of the keywords: bystander, first aid, motor vehicle accidents, car crash, car collision, lay people and witness. Thirteen articles met the selection criteria and were included in the analysis. The World Wide Web (web) was subsequently searched in response to a gap in current research on bystanders' experiences at and following a MVA. Systematic thematic coding was used in the extraction of patterns regarding bystander experiences during and after witnessing a MVA.

Results

In the exploration of bystanders' experiences during and after attending a MVA this review confirmed the presence of physical, emotional, cognitive and situational factors associated with bystander responses. Bystanders demonstrated that their response behaviours were determined by the nature of the emergency and the severity of perceived injury. In addition, bystanders weighed up the costs of helping and many felt morally responsible to offer assistance. Although there were no studies of long-term negative consequences exemplars from the web provided insight into ongoing psychological affects for bystanders.

Conclusion

This thematic literature analysis demonstrated the need for further research into the experiences of bystanders both during and following an MVA. Understanding bystander assistance in emergencies will allow health policy decision-makers to address the needs of both potential bystanders and those of actual bystanders during and post event.

Keywords

Bystander help, first aid, motor vehicle accident, experiences.

Corresponding Author: Anna Hall, anna.hall@flinders.edu.au

INTRODUCTION

Many people are injured, disabled or killed each year due to motor vehicle accidents (MVAs).(1) These accidents are witnessed by one or more bystanders who may try to manage injuries until the arrival of members of the emergency services. Situations they may witness or be involved in,

include, broken bones, severed limbs, burning flesh and death. Minimal research exists exploring bystanders' initial responses to witnessing such trauma, their actions, experiences and interactions.(2)

Throughout the world bystanders are exposed to significant traumatic events. Table 1 indicates the number of MVAs and fatalities that occurred in 2009.

Country	Fatalities	Crashes	Killed per 100,000 Inhabitants
Argentina	7,364	90,851	18.4
Australia	1,492	7,673	6.8
Austria	633	37,925	7.6
Belgium	944	48,827	8.9
Cambodia	1,717	1,802	12.6
Canada	2,419	129,862	6.3
Czech Republic	901	21,706	8.6
Denmark	303	4,174	5.5
Finland	279	6,414	5.2
France	4,273	4,273	6.8
Germany	4,152	310,806	5.1
Italy	4,237	215,405	7.1
Japan	5,772	736,688	4.5
New Zealand	384	11,125	8.9
Spain	2,714	88,251	5.9
United Kingdom	2,337	169,805	3.8
United States of America	33,808	1,517,000	11.1

Table 1: MVAs and fatalities 2008-2009
Developed from the International Transport Forum Annual Report 2010(3)

Average ambulance response times vary throughout the world with 18 minutes in Australia,(4) 8½ minutes in Wales(5) and 7 to 11 minutes in Singapore.(6) An increase in emergency response times may result in MVA victims receiving care from bystanders for longer periods of time.(7-9) The care provided in the first few minutes can make a statistical difference in both mortality and morbidity(9) and is an important factor in victim survival.(7) What is unclear is how these experiences affect bystanders at the scene and throughout the enduring weeks and months.

Minimal research has been conducted on the thoughts and reasons for bystander's actions or the identification of potential strategies to assist bystanders in managing actions, thoughts and feelings both during and after the event.

The purpose of this literature review was to examine what was known about the experiences of bystanders both at the scene, and following an MVA. Understanding these experiences will not only further elucidate the knowledge underpinning bystanders' actions at the MVA scene but increase knowledge of bystanders' interactions with others and highlight the immediate and long term affect these experiences have on bystander's physiological and emotional health. This insight will assist with the identification of

potential strategies to assist bystanders following an MVA.

METHODS

A methodical search of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline (OVID) and Informit was undertaken using the key words and combinations of the keywords: bystander, first aid, motor vehicle accidents, car crash, car collision, lay people and witness.

The inclusion and exclusion criteria (Table 2) were constructed to ensure recency and relevancy of research to the aim of the review and thus a focus on bystander, not emergency medical team (EMT) experiences. An eleven-year time frame (1999 to 2010) was set to ensure an overview of current trends in the literature.

Inclusion criteria	Exclusion criteria
Primary research articles	Literature reviews
Published in English	Not published in English
Focus on Bystanders	Primary focus on emergency service personnel
Published between 1999-2010	
Motor vehicle accident trauma	

Table 2: Initial inclusion and exclusion criteria

The initial search (Figure 1) returned ninety seven (97) studies with a further ten studies located from a manual search of the reference lists. The inclusion and exclusion criteria were applied yielding three articles.(7,8,10) The inclusion/exclusion criteria were altered to include *bystanders experiences of trauma* (2,11-13) and *cardiopulmonary resuscitation*.(14-19) because of the small number of articles meeting the review requirements (Table 3). This resulted in the inclusion of a further ten articles (Figure 1).

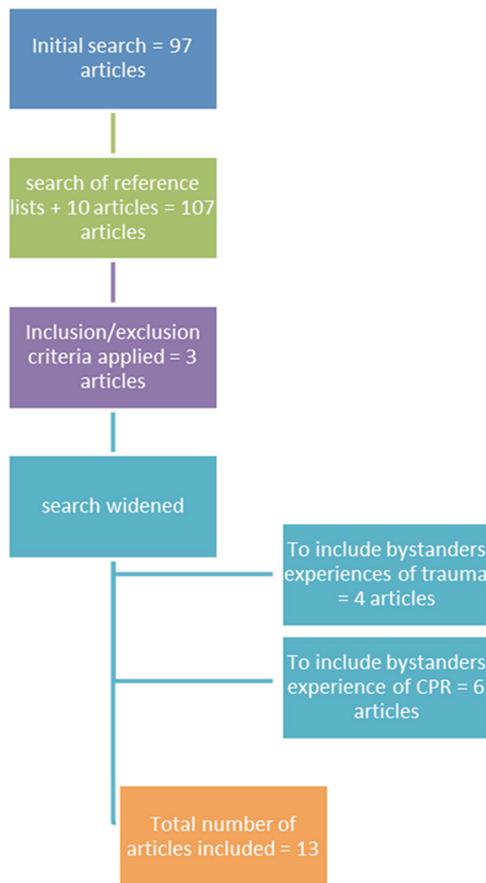


Figure 1: Article search

Inclusion criteria	Exclusion criteria
Primary research articles	Literature reviews
Published in English	Not published in English
Focus on Bystanders	Primary focus on emergency service personnel
Published between 1999-2010	
Motor vehicle accident trauma	
Bystanders experience of trauma	
Bystanders experience of cardiopulmonary resuscitation	

Table 3: Inclusion and exclusion criteria

A comprehensive review of the literature revealed a lack of research articulating bystanders' interactions with victims, emergency medical team (EMT) personnel, law enforcement personnel and other bystanders at the scene of and following an MVA. Only one study explored the action/s taken by bystanders when encountering an MVA and

retrospectively elicited their concerns during or after their intervention.(8)The World Wide Web (web) was therefore searched using the browser Internet Explorer and relevant websites were located using the advanced search options (with Boolean operators) of the search engines Google and Yahoo. Descriptors used were: *bystander, responder, rescuer, experiences, motor vehicle accident, interactions, victims, emergency medical team (EMT) and witness.*

Computer search retrieved 330,000 web pages relating to witnesses of an MVA. A sample of the stories available in 2010 was reviewed. Each story or article was read to identify exemplars to demonstrate that bystander's experiences are much more complex than shown in current primary research.

The thematic analysis of the findings of previous research and bystanders' web stories was performed using an adaptation of Braun and Clarke's Framework.(20) Thematic analysis, or the identification of themes within data, is a suitable method for the identification of themes in previously published primary research.(18,19) Articles were initially read to gain understanding of the content of the study and then re-read with the research questions in mind. To assist with the identification of themes and a critique of the research the following were tabulated: author, date, aim, setting and sample, methodology and methods, findings, limitations and relevance to the review of each article.

RESULTS

The majority of quantitative and qualitative studies met most of the assessment criteria for quality research. Data collection tools from nine of twelve quantitative studies were previously proven to be valid.(2,7,8,10-12,15,16,18) Five studies neglected to mention how or whether ethical approval was obtained.(7,11,13,14,17) Three studies focused on bystander first aid at MVAs(7,8,10) and another four studies explored bystander first aid in relation to general trauma.(2,11-13) Overall, the inclusion of bystander experiences of first aid related to cardiopulmonary resuscitation(14-18) assisted in exploring what was known about bystanders' experiences in emergency situations. The thematic analysis revealed two main themes, namely bystanders' experiences:

- At the scene
- After the event

Bystanders' Experiences at the Scene

The theme, at the scene, highlights the varied responses of bystanders when encountering an emergency trauma situation (Figure 2). Bystander

responses included failure to take any action (passive response) or the decision to take action (active response). Seven articles addressed bystanders' responses to trauma.(2,7,8,10-13) Of these articles, three were specific to trauma sustained as a result of an MVA,(7,8,10) three were in relation to general trauma(2,11,13) and one article considered bystander first aid in relation to traumatic cardiac arrest.(12) A further analysis of this theme revealed subthemes on factors influencing the degree of bystander response.

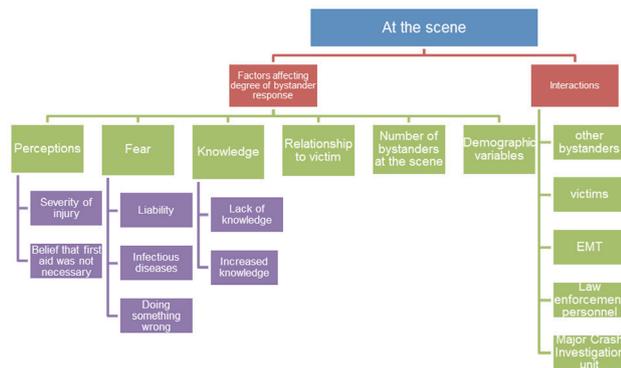


Figure 2: Theme one: Factors influencing bystanders' response

Bystanders' actions included, but were not limited to, calling emergency services, ensuring scene safety, and first aid measures including positioning the victim and controlling haemorrhage.(8) Factors which influence the degree of bystander response include varied perceptions,(8,10,11) fear,(7,8,12) knowledge,(7,8,11) relationship to the victim,(18) number of bystanders at the scene,(2,7,19,21,22) and demographic variables.(8,10)

Perceptions

Bystander perceptions impacting on their willingness to respond included the condition of the victim and the belief that first aid was unnecessary. A tentative link was demonstrated between injury severity and bystanders' active or passive response. Ninety percent of respondents (n = 85) in Peterson et al's (7) survey indicated their response was related to being first at the MVA scene and a higher perceived severity of injuries. Victims (12.7%) in Ashour et al's (12) study with an Injury Severity Score (ISS) less than 50, received bystander first aid treatment. The ISS is a numerical score (0 – 75) assigned to a victim at the scene to represent the threat to life associated with the injury or injuries.(23) Thierbach et al (11) hypothesised that bystander's response to lower ISS was related to moderately injured victims' ability to call out for help, therefore overcoming bystanders' reluctance to respond. The conscious state of the victim was not however, always equated with increased

bystander response, as victims (4.7%) also refused treatment.(8)

Bystander knowledge was not always associated with an appropriate response. Larsson, Martensson and Alexanderson (10) believe that irrespective of the level of first aid training 57% of bystanders believed emergency care was unnecessary. Similarly, Arbon and Hayes (8) showed that 50.9% of people (n = 54) who chose not to intervene at a MVA did so because of a perception that first aid was unnecessary. Bystanders' decisions not to intervene could be due to insufficient first aid knowledge and therefore an inability to judge and determine the severity of injuries and need for first aid.(10)

Fear

Bystanders' fears when encountering an MVA include the fear of liability,(8,14) fear of infectious diseases,(7,8) and fear of doing something wrong and further harming the victim.(8,11) First aid knowledge and skill may not decrease these fears as health care professionals were shown to experience the same fears when encountering an MVA.(8) Fear of liability often influenced bystanders' willingness to provide first aid at an MVA.(7,8) A small number of participants (7.7% and 4.7% respectively) stated their decision to stop or respond at an MVA would be influenced by the fear of liability.(7,8)

Fear of infectious diseases can be a hindrance to bystanders providing first aid.(7,8,14,24) Kliegel et al.'s (2000)(14) study showed that 26% of participants would be negatively influenced by fear of infection. Conversely, in Swor et al's (25) study none of the bystanders' unwillingness to perform CPR was related to concerns about infectious diseases. Fear of doing something wrong and further harming the victim was a powerful restraint to bystanders performing first aid measures.(8,11,14,25) Two bystanders in Thierbach et al.'s (11) study stated their reluctance to assist a severely injured victim was related to a fear of doing something wrong, thereby further harming the victim. Kliegel et al (14) showed that 50% of their target group and 100% of their control group rated fear as the primary reason for not performing CPR.

Knowledge

Fifty seven percent of participants (n=1,890) in Larsson et al's (10) study believed first aid was unnecessary at an MVA. Three percent of these bystanders (3%) did not administer first aid due to insufficient knowledge.(10) Bystanders were found to be less likely to provide first aid to severely injured victims, and the first aid measures provided, were often incorrect (18.6 – 65.2%).(11)

Four studies demonstrated a considerable increase in the number of people willing to provide first aid following first aid training.(2,7,8,14) Peterson et al (7) showed that participants (n = 436) willingness to stop and provide assistance at the scene of an MVA increased from 16.4% (n=82) prior to training, to 87% immediately following training. Similarly, Kliegel et al (14) demonstrated an increase from 59% to 85% in participants' intentions to assist in a cardiac emergency after CPR training.

The association between first aid training or a higher level of knowledge and the likelihood of the correct response is not always positive. Pelinka et al (2) showed that bystanders who had completed first aid training were more likely to correctly position the trauma patient, extricate a trauma patient, and control haemorrhage. Pelinka et al found that 10% of people with either advanced training or health care qualifications did not correctly control haemorrhage.(2) Similarly, Breckwoldt, Schloesser and Arntz (19) found that only 73.9% of nurses (n=17) and 87.5% of doctors (n=7) were able to detect circulatory arrest.

Relationship to the Victim

Personal knowledge of, and relationship to, the victim can influence bystanders' responses.(2,18,19) Only 7% of subjects (n=75) were willing to perform CPR on strangers, however, this number increased to 13% (n=147) for family and friends.(18) In contrast, Breckwoldt et al (19) found bystander CPR was performed on 22.8% of victims at home and 53.8% in public locations. Conversely, Pelinka et al (2) demonstrated that a relationship to the trauma victim did not affect whether first aid measures were performed.

Number of Bystanders at the Scene

The number of bystanders present at the MVA scene can potentially influence bystanders' responses. This is a well researched social phenomenon known as 'The Bystander Effect', whereby the more people present at an emergency, the less likely individuals are to provide assistance.(26,27) Measures of trauma care were usually performed correctly if only one bystander was present.(2) Despite an increase in the number of bystanders present, first aid measures are not performed more often, or correctly.(2) This may be due to the tendency to rely upon another to take action which is related to diffusion of responsibility.(2) Conversely, Breckwoldt et al (19) stated that detection of out-of-hospital cardiac arrest is more likely if more than one bystander is present. This could be due to mutual support given to one another, thereby aiding in the realisation of what is happening to the victim.(19)

Demographics

Demographic variables correlating with active bystander response at an MVA were older age (9-10% of respondents were 45-74 years old) and a higher level of education.(8,10)

Bystander Interactions

Eighty three percent (n=616) of participants who performed first aid rated the interaction with EMT at the scene as positive.(28) Skora and Riegel (29) suggested that a positive interaction with the EMT included reassurance and praise, and a request for bystander ongoing involvement with the victim until the EMT were sufficiently prepared to take over. Ransie and Burke (30) showed similar findings whereby continued involvement of the responder was seen as a positive interaction with the EMT.

Even though a consensus exists that EMT members must be aware of the vulnerable position of the bystander, there continues to be exemplars of negative interactions at accident scenes.(28,29) Bystanders' interactions with law enforcement personnel are not well covered in the present research. Law enforcement officers do however determine which independent bystanders have seen the most at the MVA scene and elicit contact details of these individuals.(31)

Law enforcements officers' failure to identify all relevant bystanders was substantiated by the number of calls for witnesses to an accident from both insurance companies and victims on both the web and in print media.

The very fact that bystanders provide first aid assumes an interaction with victims at the scene of an MVA. Current research mainly focuses on bystanders' actions at the scene and rarely examines interactions between bystanders and victims. As a comprehensive review of the literature revealed a lack of research on bystanders' interactions at the scene. An analysis of exemplars on the web provides an indication of the diversity of such interactions from the bystanders' perspectives. These interactions include the provision of reassurance, encouragement and hope to the victim.(32-34) and the interactions between victim and bystander often provided reciprocated feelings of reassurance, encouragement and hope to the bystander.(34-36)

After the Event

The theme, after the event, explores aspects of bystanders' encounters after experiencing an MVA. Only one article explored the experiences of bystanders following the MVA.(8) A review of websites and interviews revealed information on the legal and psychological aspects of bystander

experiences. Within this theme there are subthemes which illuminate the experiences of the bystander following the event (Figure 3).

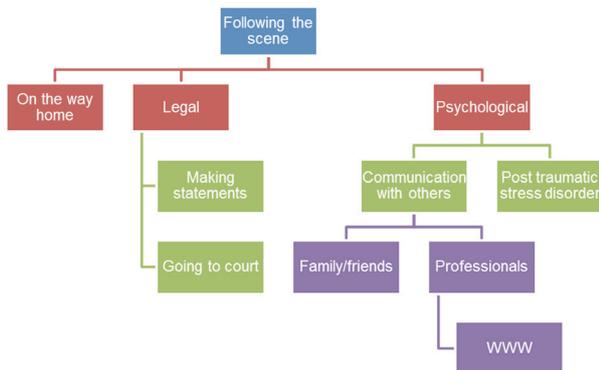


Figure 3: Theme two: After the event

Any person involved in, or assisting at, the scene of an MVA would be expected to experience an immediate and ongoing sympathetic response, physiological distress, and discomfort.(37) Such a response could affect bystanders' journey home and their psychological status on arrival home.(37) Indeed, the driving ability of bystanders in the immediate period post-accident could be problematic due to '...the state of shock...'.(31) The main bystanders who witnessed the MVA have contact details taken and are then contacted in the following weeks or months to make a formal statement to an investigator.(31) If it is a criminal matter, the bystander will need to go to court, thus the investigator informs them of the court process.(31,38)

Debriefing is used following a traumatic event to reduce distress through participants' reflections on their experiences.(39) Sixty five percent (n = 482) of responders involved in working with victims at the scene of an MVA, desired an opportunity to talk with someone about these experiences.(28) Organised debriefing following the event was however, rare or non-existent.(28,30) Bystanders who have their contact details noted by police at the scene receive a phone call within three to five days of the incident and are provided with contact details of agencies that support victims and witnesses of MVAs.(31)

Multiple people may witness an accident and could be affected by this experience. It is however, unknown what criteria is used to approach bystanders for their contact details, and whether bystanders who are not contacted are aware of, or access, available support services.

Interaction with someone following an event enables the person to comprehend, adjust, and move on.(28,30) Debriefing, for the majority of bystanders, was however informal.(28,39) For example, 75% of bystanders in Axelsson et al's (39) study discussed the accident with workmates,

friends or relatives. Forty-two percent (42%) of bystanders who rated their CPR intervention negatively did not talk to anyone following the event.(39) A percentage of bystanders: 13%,(28) 10%,(39) and 25%(29) stated they had not spoken to anyone with regard to the resuscitation they performed. Factors influencing bystanders' ongoing reaction was: having someone to talk to post event, how interaction with EMT was regarded, and whether they were able to talk to EMT personnel.(39) Sixty-two percent of the participants who did not speak to anyone after the event would have appreciated discussing the situation.(39)

A plethora of websites exist allowing victims, and families of victims, to share stories and connect with others who have similar experiences (Table 4). An analysis of discussion forums shows that relatives or bystanders attempt to contact one another.

Although the education of EMT personnel better equips them to deal with mutilation, burning bodies, death of children, multiple casualties, and life threatening situations on a regular basis.(42-44) their employing organisations recognise that such experiences can, over time, cause physical and psychological exhaustion.(44) Bystanders and responders who witness and experience these traumatic situations could therefore be assumed to experience the same, or a higher, degree of distress.(42) Minimal research exists on the impact of the traumatic event on bystanders of an MVA. An analysis of newspaper and individuals' accounts on the web clearly show that bystanders are also affected for unidentified periods of time after witnessing an accident. The World Health Organisation (WHO) (45) acknowledges Acute Stress Reaction (ASR) in the International Classification of Diseases (ICD). The ICD describes an ASR as a temporary psychological disorder, which presents immediately or within a few minutes, in response to a significant physical and/or mental stressor and can last for hours to days. If the psychological response continues past this time frame the person is said to be suffering from post-traumatic stress disorder (PTSD). Post-traumatic stress disorder (PTSD) is a set of psychological reactions to a traumatic event.(46) PTSD can occur after experiencing or witnessing an event, for example an MVA whereby the lives or safety of victims, bystanders or EMT or others around them were threatened.(46)

DISCUSSION

This literature review illuminated a gap in the current literature surrounding the experience of bystanders at MVAs. What is clear is that bystanders have a vast array of experiences at and following the scene of the MVA. Knowledge of

the impact on EMS personnel of working in trauma situations would suggest that bystanders (who have less education and formal support) are affected by witnessing traumatic events such as an MVA. Research into the effects of a traumatic event on bystanders was however lacking. Numerous websites identified the desire of bystanders to talk about their experiences, however primary research on their ongoing debriefing needs is also lacking.

Current research did not allow an illumination of the bystanders' interpretations of the meaning of their experiences of interacting in trauma settings. It was therefore difficult to determine factors influencing their decision to intervene. Moreover, no research addressed the relationship between bystander's physiological and cognitive response and their actions at the scene and ability to cope when driving home and in the next few hours, days and weeks.

The limitations of this literature review have been acknowledged and highlighted. They include the inability to locate primary research articles on the experiences of the bystander at an MVA. Due to this articles on bystander's experiences of trauma and CPR had to be included. This is a limitation however it serves to highlight the need for further primary research in this area.

CONCLUSION

This review demonstrated the need to increase knowledge of the experiences of bystanders both during and following an MVA. A minority of bystanders either failed to stop and assist; or stopped and observed but did not offer assistance to victims of road trauma. A number of factors were seen to influence the degree of bystander response: namely, presence of EMT, bystander perceptions, fear, knowledge, relationship to the victim, number of bystanders at the scene and demographic variables.

Bystanders are exposed to unique traumatic situations which are physically, emotionally and cognitively challenging not only in the immediacy of the event but in the enduring weeks and months which follow. Further research into the short and long term effects of bystanders experience during and following a MVA is warranted to illuminate the state of the bystander on their journey and on arrival home.

CONFLICT OF INTEREST

The authors declare they have no conflict of interest.

ACKNOWLEDGEMENTS

We would like to thank Flinders University for their Summer Vacation Scholarship.

REFERENCES

1. Australian Bureau of Statistics. Causes of Death, Australia. 2010 [cited 2009 Mar 16]; ABS cat. No. 3303.0. Available from: <http://www.abs.gov.au>
2. Pelinka L, Thierbach A, Reuter S & Mauritz W. Bystander trauma care – effect of level of training. *Resuscitation*. 2004;6:289-296.
3. International Transport Forum. International Traffic Safety Data & Analysis Group. Annual Report. 2010; Available from: <http://www.internationaltransportforum.org/irtad/pdf/10IrtadReport.pdf>
4. Australian Bureau of Statistics. Motor Vehicle Census. Australia. 2009 [cited 2009, March 16]; ABD cat. no. 9309.0 Available from: <http://www.abs.gov.au>
5. BBC News Wales. Wales has the 'slowest' ambulance 999 responses in 2009. BBC News. 2010; Available from: <http://www.bbc.co.uk/news/10274201>
6. Shah CH, Ismail I, Mohsin SSJ. Ambulance response time and emergency medical dispatcher program: a study in Kelantan, Malaysia. *South East Asian Journal of Tropical Medicine & Public Health*. 2008;39(6):1150-1154.
7. Peterson T, Noland S, Russell D, Paradise N. Bystander trauma care training in Iowa. *Prehospital Emergency Care*.1999;2:225-230.
8. Arbon P, Hayes J. First aid and harm minimisation for victims of road trauma: a population study, final report. NRMA Australian Capital Territory Road Safety Trust. 2007; Available from http://clicktosave.com.au/wp-content/uploads/2013/06/Australian_Population_Study_on_victims_of_Road_Trauma1.pdf
9. O'Keeffe C, Nicholl J, Turner J, Goodacre S. Role of ambulance response times in the survival of patients with out-of-hospital cardiac arrest. *Emergency Medicine Journal*. 2010;28(8):1-4.
10. Larsson E, Martensson N, Alexanderson K. First-aid training and bystander actions at traffic crashes – a population study. *Prehospital and Disaster Medicine*. 2003;17(3):134-141.
11. Thierbach AR, Pelinka LE, Reuter S, Mauritz W. Comparison of bystander trauma care for moderate versus severe injury. *Resuscitation*. 2004;60:271-277.

12. Ashour A, Cameron P, Bernard S, Fitzgerald M, Smith K, Walker T. Could bystander first-aid prevent trauma deaths at the scene of injury? *Emergency Medicine Australasia*. 2007;19:163-168.
13. Tomruk O, Soysal S, Gunay T, Cimrin A. First aid: level of knowledge of relatives and bystanders in emergency situations. *Advances in Therapy*. 2007;24(4):691-699.
14. Kliegel A, Scheinecker W, Sterz F, Eisenburger P, Holzer M, Laggner A. The attitudes of cardiac arrest survivors and their family members towards CPR courses. *Resuscitation*, 2000;47:147-154.
15. Jennings P, Pasco J. Survival from out-of-hospital cardiac arrest in the Geelong region of Victoria, Australia. *Emergency Medicine*. 2001;13(3):319-325.
16. Lateef F, Anantharaman V. Bystander cardiopulmonary resuscitation in prehospital cardiac arrest patients in Singapore. *Prehospital Emergency Care*. 2001;5(4):387-390.
17. Celenza T, Gennal H, O'Brian D, Jacobs I, Lynch D, Jelinek G. Community competence in cardiopulmonary resuscitation. *Resuscitation*. 2002;55:157-165.
18. Kuramoto N, Morimoto T, Kubota Y, Maeda Y, Seki S, Takada K, Hiraide A. Public perception of and willingness to perform bystander CPR in Japan. *Resuscitation*. 2008;79:475-481.
19. Breckwoldt J, Schloesser S, Arntz HR. Perceptions of collapse and assessment of cardiac arrest by bystanders of out-of-hospital cardiac arrest (OOHCA). *Resuscitation*. 2009;80:1108-1113.
20. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006;3:77-101.
21. Fischer P, Greitemeyer T, Pollozek F, Frey D. The unresponsive bystander: Are bystanders more responsive in dangerous emergencies? *European Journal of Social Psychology*. 2006;36:276-278.
22. Levine M, Crowther S. The responsive bystander: How social group membership and group size can encourage as well as inhibit bystander intervention. *Journal of Personality and Social Psychology*. 2008; 95(6):1429-1439.
23. Trauma.org. Trauma Scoring [Internet]. (United Kingdom): Trauma.org; 2010 [cited 2009 Apr 8]. Available from: <http://www.trauma.org/archive/scores/iss.html>
24. Sayre M, Berg R, Cave D, Page R, Potts J, White R. Hands-only (compression-only) cardiopulmonary resuscitation: A call to action for bystander response to adults who experience out-of-hospital sudden cardiac arrest. *Circulation*. 2008;117:2162-2167.
25. Swor R, Kahn I, Domeier R, Honeycutt L, Chu K, Compton S. CPR training and CPR performance: Do CPR-trained bystanders perform CPR? *Academic Emergency Medicine*. 2006;13:596-601.
26. Fischer P, Greitemeyer T, Pollozek F, Frey D. The unresponsive bystander: Are bystanders more responsive in dangerous emergencies? *European Journal of Social Psychology*. 2006;36:276-278.
27. Levine M, Crowther S. The responsive bystander: How social group membership and group size can encourage as well as inhibit bystander intervention. *Journal of Personality and Social Psychology*. 2008;95(6):1429-1439.
28. Axelsson A, Herlitz J, Ekstrom L, Holmberg S. Bystander-initiated cardiopulmonary resuscitation out-of-hospital: A first description of the bystanders and their experiences. *Resuscitation*. 1996;33:3-11.
29. Skora J, Riegel B. Thoughts, feelings, and motivations of bystanders who attempt to resuscitate a stranger: A pilot study. *American Journal of Critical Care*, 2001;10(6):408-416.
30. Ransie J, Burke D. Exploring the volunteer first aiders' experience post-resuscitation. *Journal of Emergency Primary Health Care*. 2006;4(3):1-10.
31. Major Crash Investigation Team of South Australia (P Isherwood, 2010, pers. comm. 6th August).
32. New Jersey Real-Time News 2. Your comments: Witnesses of fatal I-78 motorcycle crash discuss details, share sorrow with victims' family. *New Jersey Real-Time News*. USA. 2010; Available from: http://www.nj.com/news/index.ssf/2010/06/your_comments_witnesses_of_fat.html
33. Wilson B. Witness speaks out on fatal bus crash. *News8wtnh.com* website. USA. 2010; Available from: http://www.wtnh.com/dpp/news/hartford_cty/witness-speaks-out-on-fatal-bus-crash
34. Shannon. *Car-Accidents.com* website. 2006; Available from: <http://www.car-accidents.com/2006-Auto-story/12-15-06-brush-death.html>
35. Mitchell J. Critical Incident Stress Debriefing. *iTrauma*. 2010; <http://www.info-trauma.org/flash/media-e/mitchellCriticalIncidentStressDebriefing.pdf>
36. Fact sheet: Information for Victims of Crime. Australia: Government of South Australia Attorney-General's Department; 2009.
37. Palmer S. *Physiology of the Stress Response*. Centre for Stress Management. 2000; Available from: <http://www.managingstress.com/articles/physiology.htm>

38. Fact sheet: Information for Victims of Crime. Australia: Government of South Australia Attorney-General's Department; 2009.
39. Axelsson A, Herlitz J, Karlsson T, Lindquist J, Reid Graves J, Ekstrom L, Holmberg S. Factors surrounding cardiopulmonary resuscitation influencing bystanders' psychological reactions. Resuscitation. 1998;37:13-20.
40. Journey Beyond Road Trauma. Journey Beyond Road Trauma [AU]; 2010 [cited 2009 Apr 6]. Available from: www.journeybeyondroadtrauma.org
41. Car Accident Blog and Discussion Forum. Car Accident Blog and Discussion Forum; 2010 [cited 2009 Apr 6]. Available from: <http://car-accidents.com/>
42. Road Trauma Support. Road Trauma Support [AU]; 2010 [cited 2010 Sep 5]. Available from: www.roadtraumasupport.com.au
43. Enough is Enough Anti Violence Movement Inc. Enough is Enough Anti Violence Movement Inc. [AU]. 2010 [cited 2010 Sep 5]. Available from: www.enoughisenough.org.au
44. Experience Project. Experience Project; 2010 [cited 2010 Sep 5]. Available from: <http://www.experienceproject.com/index.php>
45. World Health Organisation. The ICD-10 Classification of Mental and Behavioural Disorders: clinical descriptions and diagnostic guidelines; 1993 [cited 2011 Jul 7]. Available from: <http://www.who.int/classifications/icd/en/bluebook.pdf>
46. Australian Centre for Post Traumatic Mental Health, Posttraumatic Stress Disorder (PTSD). Australian Centre for Post Traumatic Mental Health [AU]; 2010 [cited 2010 Sep 5]. Available from: <http://www.acpmh.unimelb.edu.au/trauma/ptsd.html>

Websites	Country of Origin	Participants	Bystander resources
Journey Beyond Road Trauma (2010)(40) www.journeybeyondroadtrauma.org	Australia	Victims, families	<ul style="list-style-type: none"> • Tributes • Blog • Memory spaces • Forums • Counsellors • Support groups
Car Accident Blog and Discussion Forum (2010)(41) www.car-accidents.com	USA	Victims, families	<ul style="list-style-type: none"> • Forum • Discussion • Questions
Road Trauma Support Team (2010)(42) www.roadtraumasupport.org.au	Australia, each state and territory	Victims, families	<ul style="list-style-type: none"> • Confidential counselling • Information about other services • Support groups • Drivers support • Bereavement
Enough is Enough Anti-violence movement inc. (2010)(43) www.enoughisenough.org.au	Australia, New South Wales	Victims, families	<ul style="list-style-type: none"> • Antiviolence movement including road trauma support • Links to other services • Counselling • Support groups • Blog
Experience Project (2010)(44) www.experienceproject.com	USA	Victims	<ul style="list-style-type: none"> • Stories • Forum

Table 4: Analysis of MVA Websites