

RESEARCH REPORTS

CONSTRUCTION EMPLOYEE'S EXPERIENCES OF BEING INVOLVED AS A LAYPERSON FIRST-AID PROVIDER IN A SERIOUS WORKPLACE INJURY EVENT: A QUALITATIVE STUDY

Pia Hedberg*¹; Hans Hedberg²; Michael Haney²; Sofia Karlsson³; Jonas Aléx¹

Author Affiliations: 1. Department of Nursing, Center for Disaster Medicine, Umeå Universitet (Umea University), Umeå, Sweden; 2. Department of Diagnostic and Intervention, Anesthesiology and Intensive Care Medicine, Umeå Universitet (Umea University), Umeå, Sweden; 3. Department of Business Administration, Umeå School of Business, Economics, and Statistics, Umeå Universitet (Umea University), Umeå, Sweden.

Recommended Citation: Hedberg, P., Hedberg, H., Haney, M., Karlsson, S., & Alex, J. (2025). Construction employee's experiences of being involved as a layperson first-aid provider in a serious workplace injury event: A qualitative study. *International Journal of Paramedicine*. (12). 56-67. <https://doi.org/10.56068/ANAX3095>. Retrieved from <https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3341>

Keywords: workplace injury, accident, first aid, layperson, bystander, trauma, emergency care, emergency medical services, EMS, paramedicine

Disclosures: The authors report there are no competing interests to declare.

Funding: Funding sources include The Development Fund of the Swedish Construction Industry (SBUF) funded the study (ref,13987), the Medical Faculty of Umeå University, Sweden, and the Department of Anesthesiology and Intensive Care Medicine at the University Hospital of Umeå. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Received: February 4, 2025

Accepted: May 1, 2025

Published: October 8, 2025

**Corresponding Author:* pia.hedberg@umu.se

Author Interview:

<https://youtu.be/DJg4v9s0bDQ>



ABSTRACT

Background: Workplace-related serious injury events are a recognized problem in Europe, with construction sites bearing a higher risk compared to other workplaces. Sweden reports approximately 1,000 serious injury per year. Layperson involvement in workplace injury events can be stressful and may impact their ability to respond effectively. There is a knowledge gap concerning how workers in this context perceived their role.

Aim: To describe Swedish construction employees' experiences of being involved as a layperson first aid provider in a serious workplace injury event.

Method: A total of nine construction employees were interviewed. Their ages ranged from 22 to 66 years, and varying experience in the construction industry, from 5 to 41 years. Eight had completed a first aid course at their workplace within the last three years. None of the participants had a background in areas such as rescue services, police, healthcare, or military. None of the construction sites had trained EMTs or company medical personnel on site. The transcribed text from the interviews was analyzed using qualitative content analysis.

Results: The study showed that construction employees experiences of being involved as a layperson first aid provider was linked to one main category: to try to reduce the consequences of limited knowledge through mutual understanding and support. There were three additional categories for reported experiences: suddenly trying to save lives after realizing the unexpected, the importance of collaboration in a chaotic situation, and the need for social support and following improvements with subcategories.

Conclusion: The results showed that with injury events in a complex environment, such as construction sites, there is a need for mutual understanding between dispatcher, ambulance services, rescue service, and laypersons. A level of understanding from professional organizations is required to support the layperson to be a valuable resource to the emergency personnel in serious workplace injury events.

INTRODUCTION

Workplace-related serious injury events are a well-recognized problem in Europe, with construction sites bearing a higher risk of such events compared to other workplaces (Berglund et al., 2021; Perlman et al., 2014). One explanation for this heightened risk is that construction sites often operate under exposed conditions with varying safety margins and significant time pressure (Hansen et al., 2022). To put this in our study context, Sweden reports approximately 1,000 serious injury events each year (medical leave of absence for thirty days or longer), including some fatalities (Berglund et al., 2021). Serious injury events occur suddenly, involving a substantial release of energy on the human body. This high-energy impact leads to a primary injury where there can also be secondary injuries for the person including, for example, inadequate breathing or circulation after the primary injury (Winge., 2019).

When serious injuries occur on construction sites, it is necessary to gain a comprehensive understanding of the specific situation and the mechanisms underlying the injury (Lennquist, 2017). Time is an important factor, and swift implementation of life-saving actions is essential as these actions can potentially influence the injury's outcome (Pham et al., 2017). Early assessments and interventions by laypersons, or persons without advanced emergency care training are important, especially in situations like cardiac arrest but also in injury events (Linderoth et al., 2021; Ter Avest et al., 2019). Laypersons can perform life-saving actions before the arrival of an ambulance. In a study by Bakke et al. (2015) where 330 prehospital trauma alerts and interventions were observed, it was noted that 35% of laypersons had received first aid training. Those with first aid training tended to perform more accurate and effective actions compared to those without such training. It is also worth noting that first aid administered by laypersons can sometimes be executed incorrectly (Tannvik et al., 2012).

Being involved in a workplace injury event as a layperson can be a stressful experience and can affect their ability to act effectively. Three basic conditions usually should be met for a layperson to act in the event of an injury: (a) the person must have personally witnessed the injury event, (b) the person must perceive the situation as an emergency, and (c) the person must decide to assist the injured individual by acting (Sepahvand et al., 2020, 2023). Acting as a layperson in the event of an injury requires courage, knowledge, and swift action (Duut et al., 2022). Presently, there is limited knowledge of how employees in the construction industry react and act when they find themselves in the role of saving a colleague's life during a serious injury event. Knowledge from this study can increase the understanding of how dispatchers and rescue personnel (emergency medical services) could interact and cooperate with laypersons in event of serious injuries at a construction site to improve responses. Furthermore, this knowledge can also deepen understanding of the support that construction employees acting as layperson first responders may require to mitigate potential negative consequences in the case of serious workplace injury events.

AIM

This study aims to describe the experiences of layperson, construction employees who have been involved as first aid providers in a serious workplace injury event.

METHODS

STUDY DESIGN

This qualitative study was conducted with semi-structured individual interviews and reported following the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007).

PARTICIPANTS

The data collection took place in Sweden in 2022, and a convenience sampling was used with participants recruited from various construction companies in Sweden. To be included, it was required that, for the event involved, the emergency number 112 had been dialed, that an ambulance arrived at the scene, and that the injured person needed ambulance transportation into hospital. Ten individuals agreed to participate in the study, and then one opted out before the interview. A total of nine were interviewed, eight of whom were men and one was a woman. Their ages ranged from 22 to 66 years, and they had worked in the construction industry for varying lengths of time, from 5 to 41 years. Eight of these had completed a first aid course at their workplace within the last three years. None of the participants had a background in areas such as rescue services, police, healthcare, or military. None of the construction sites had trained EMTs or company medical personnel on site.

DATA COLLECTION

An interview guide was created by the authors and was based on the context to be studied: i) when the injury event occurred, ii) management of the injury event, and iii) after the injury event. The interviews began with an open question, "Can you tell me about when you performed first aid for one or several colleagues? Report freely about what you experienced from the time of discovery of the injured, the emergency call to 112, and to transport by ambulance. Try to describe what you thought, felt and what you did." Follow up-questions, if these details were not included in the account, included for example, "What did you think when you saw that your colleague was injured?," "What did you do?," "How did you take care of the injured person?," and "How did it feel to give your colleague first aid?" Six participants were interviewed live on a digital video platform (TEAMS®), and three participants interviewed at their workplace in a private room without any distractions. All interviews lasted between 35 to 50 minutes and were recorded and then transcribed verbatim.

ANALYSIS

Interviews were analyzed using a qualitative content analysis method as described by Granheim and Lundman (Graneheim et al., 2004, 2017). The analysis process initially sorted all the text into a common analysis database (Word-ds). Common words and sentences were identified and grouped into meaningful units. Subsequently, a condensation of the texts was performed to reduce the volume without losing the essence of the participants' descriptions. The condensed text was further abstracted and compared against the original meaningful units. Afterward, the common text fragments from all transcripts were coded and grouped into subcategories, which were then organized into categories and main category describing the findings at a descriptive level.

ETHICS

The study has been approved by the Swedish Ethical Review Authority (document number 2021-05774-01). All participants provided informed consent before entering the study. All methods were carried out in accordance with relevant guidelines and regulations.

RESULTS

One main category and three additional categories with nine subcategories were identified which illustrated construction employee experiences of being involved as a layperson first aid provider in a serious workplace injury event. These are exemplified with citations (Table 1).

Main category	Categories	Subcategories
To try to reduce the consequences of limited knowledge through mutual understanding and support.	Suddenly trying to save lives after realizing the unexpected	Understanding that a serious injury has occurred
		Initiating an own response
		First aid activities for individuals and teams
		Inexperience, fear of doing wrong
	The importance of collaboration in a chaotic situation	Acting with support from dispatcher
		Support from ambulance and rescue service
	The need for social support and following improvements	Stated desire for early support and later follow-up
		Long-term psychology experience
		Trying to learn from injury event experience

Table 1. Main category, categories and subcategories illustrated construction employee's experiences of being involved as a layperson first-aid provider in a serious workplace injury event.

SUDDENLY TRYING TO SAVE LIVES AFTER REALIZING THE UNEXPECTED

Four subcategories were highlighted: Understanding that a serious injury has occurred, initiating an own response, first aid activities own and team, and inexperience, fear of doing wrong affected the initiation of starting some kind of rescue effort.

UNDERSTAND THAT A SERIOUS INJURY HAS OCCURRED

Attempting to understand what had happened was described as important in the role of laypersons. Participants highlighted that when a risk escalated into a serious injury event, they described a profound change in their awareness. It became surreal and challenging to grasp the reality of a serious injury event. To comprehend reality, participants described that they relied on their sensory experiences to understand and create awareness of what had occurred.

As one participant expressed:

"I initially thought it wasn't him who had fallen down; I was convinced that it was some construction material. It felt surreal."

INITIATING AN OWN RESPONSE

The participants described how the event created immediate stress with a strong sense of discomfort. The initial thought was an immediate reaction of just wanting to walk away from there, to move away from the scene of the injury event. This thought then transitioned into a desire to help and take responsibility. They described that many col-

leagues were standing and watching in what they described as a chaotic environment. Taking action involved the ability to maintain composure, not hesitate, as the participants described it, to take initiative, organize, and support by thinking steps ahead.

"The feeling was to simply try to assess the situation while also supporting the colleagues who couldn't immediately handle the situation."

FIRST AID ACTIVITIES FOR INDIVIDUALS AND TEAMS

The participants described first aid activities as despite their sense of stress they still worked together within their team. Medical actions were initiated and carried out, such as supporting the injured person's breathing, applying initial dressings, and warming the injured person.

The participants further described that their teamwork in mutual assistance, collectively devising innovative solutions such as constructing a stretcher or moving equipment that was in way, ensuring an adequate number of colleagues were present, and providing support to each other in the chaotic situation. This teamwork was described as a way to maintain calm within the group, a calmness that was conveyed to the injured person.

"There were perhaps about 10 colleagues around when this happened, everyone behaved, it was professional considering how people tend to react. It felt really good and safe."

INEXPERIENCE, FEAR OF DOING WRONG

The participants experienced the events as unexpected, something they hadn't mentally prepared for or, as they described, trained in advance. They described how they lacked experience in assessing and managing these severe conditions, with severe bleeding being particularly challenging. Additionally, they encountered difficulties in understanding how medical materials worked, from opening packages to knowing how to correctly apply pressure dressings for severe bleeding. The condition of the injured person created fear among the first aid responders, which the participants described as a fear of making mistakes and worsening the injury. This fear, as described by the participants, primarily occurred when the injured person was unconscious and when the participants assessed that the airway was blocked and needed to be addressed physically at the scene of the injury. Fear was also described during the encounter and conversation with the injured person, and the fear was related to not wanting to provide incorrect information, something that the participants described as particularly pronounced when they themselves did not know the extent of the person's injuries.

"I hold him so he gets air, I've pulled him out so he can breathe. Then I don't want to do much more because he was pretty bad, I didn't want to move his neck so much."

THE IMPORTANCE OF COLLABORATION IN CHAOTIC SITUATION

The category delineated the participants' experiences of collaboration, both between emergency call dispatchers and the personnel in the ambulance or rescue services. These experiences were divided into two subcategories: Acting with support from a dispatcher and Support from ambulance and rescue services.

ACTING WITH SUPPORT FROM DISPATCHER

The collaboration with society's emergency responders began even before the ambulance and rescue service arrived at the scene of the injury event. Participants described this collaboration as commencing when they dialed the emergency number 112 and talked to the dispatcher. The initial feeling that arose during the conversation with the dispatcher was described as a sense of calm among the participants, a feeling of security simply by knowing that an ambulance was on the way. Furthermore, the participants described a mutual collaboration, where they needed to receive advice and support from the dispatcher, while the dispatcher needed a clear description of the event's situation and guidance to accurately describe the address and approach route for the ambulance and rescue service personnel. Participants highlighted important factors in collaboration with the dispatcher, such as ensuring that mobile coverage was available and, in cases where a fixed address was not available for a construction site, clear coordinates were provided.

The initial sense of calm among the participants quickly turned into a feeling of discomfort on occasions when they had to wait for an extended period for the ambulance to arrive at the scene. Participants described this waiting as compelling, compelling them to continue assisting the injured person during the ongoing emergency call, but now with support and collaboration with the dispatcher while awaiting the ambulance.

"The conversation with the dispatcher was calm and instructive, they are trained for this. They ask where you are, where you work, where you are located. What does the place look like? So, they keep talking to you and providing support. It was very reassuring because you get scared yourself. You want the ambulance to be here now."

SUPPORT FROM AMBULANCE AND RESCUE SERVICE

When the ambulance arrived at the scene, the participants described it as an overall calmness prevailed. Through this feeling, the participants fully relinquished their responsibility to the ambulance personnel, and a strong desire arose to leave the injury site. The participants understood that their effort was not over even though the ambulance was on the scene. The work had to continue, but now in collaboration with the ambulance and rescue service personnel. This awareness was described as arising through the ambulance personnel's ability to convey calmness. Collaboration with the ambulance personnel was based on communication among each other. The participants described that the calmness and clarity of the ambulance personnel helped them understand what they needed to assist with, and through their guidance, they executed tasks together.

"He wanted my help, so I buttoned up the collar. I had no idea how tight to fasten it; we did it together. He was good, calm, and easygoing."

THE NEED FOR SOCIAL SUPPORT AND FOLLOWING IMPROVEMENTS

The participants described how the event affected them even afterward once the injured person was transported to the hospital. The participants described a stated desire for early support and later follow-up, long-term psychology experience, and trying to learn from injury event experience.

A STATED DESIRE FOR EARLY SUPPORT AND LATER FOLLOW-UP

After the injury event, there was a strong desire among participants to come together, to gather and discuss the experience. They referred to this gathering as a check-in, where their primary concern was to assess the well-being of all involved and determine if anyone needed immediate support or assistance. When the crisis management team was in place and began functioning, participants described it as a positive experience, having the opportunity to share their stories or feel acknowledged. However, during the initial period following the injury, participants noted that they had to rely on each other for support. From this phase of taking care of each other, participants described the need for external support from the company's management organization. They described this external support as a crisis team responsible for monitoring all involved individuals, providing updates on the injured person's condition, and offering information to family members. When this support was lacking, disappointment arose, including disappointment over the time it took to receive assistance.

"We were disappointed with how we had been handled, that is, from the top, by our management. Yes, it took some time before any support was provided."

LONG-TERM PSYCHOLOGY EXPERIENCE

The participants described experiences of the injury events as affecting them both in the short and long term. Returning to their workplace initially felt good, but at the same time, they described that the feeling of the injury event still lingered. Participants explained that those particularly vulnerable were the persons who were close to the injured person, those who tried to save lives during the injury event.

"The ones who suffered the most were those who tried to save him, yes, to do something. Yes, it's a trauma that never leaves you, or a memory that never leaves you."

TRYING TO LEARN FROM INJURY EVENT EXPERIENCE

The injury event led to insights that participants described, and participants provided suggestions for new approaches to organizational procedures and training methods. Considering the need to guide individuals (ambulance) on a construction site without an address, it immediately became challenging, and the participants emphasized the importance of this in training, that appointing someone to lead the way could prove advantageous. Furthermore, the on-site response equipment could undergo further development to better handle severe traumatic injuries, replacing outdated equipment. The primary aspect highlighted by the participants was the experience of being present during an injury event.

"To analyze the worst-case scenario, if I put it that way, how do we handle it, who does what, and that's something I take with me, that we need to plan before the worst can happen."

DISCUSSION

This study aimed to describe the experiences of construction employees who have been involved as layperson first aid providers in a serious workplace injury event.

The participants encountered uncertainty and challenges when attempting to recognize, comprehend, interpret, and raise awareness of the injury event. The realization of such

an event led to a major shift in their consciousness, and they relied on their sensory perceptions to comprehend the situation and take appropriate actions. According to Perlmán et al. (2014), these challenges in recognition and understanding can be attributed to the work environment, where sound and other distractions can impede sensory perception and affect their ability to interpret and understand.

The attempt to act and take responsibility emerged as a significant issue in our results and is in accordance with Sepahvand et al. (2020, 2023) that argue that bystanders observe each other on the scene, and if they do not interpret the situation as an emergency, they do not act either. Initially, the study participants experienced discomfort and a fight-or-flight reaction, but they eventually transitioned into a desire to provide assistance and take responsibility. It was noted that individuals reacted differently to the situation. Some participants proactively initiated life-saving actions, while others initially observed the event without acting. We interpret this variation in responses as possible forms of the bystander effect. According to the bystander effect, the presence of others leads to the diffusion of responsibility, meaning that each of the individuals present does not act because they believe someone else will offer help (Fischer et al., 2011). Our results demonstrate that some participants can take responsibility for the situation and thus act. We infer that when other bystanders realize that someone is taking the lead, they also take responsibility and act, which contradicts hesitation related to the bystander effect. This can be attributed to the close relationships that existed between the participants and the injured individual, a conclusion also highlighted by Hal et al. (2013).

Insecurity and doubt were common feelings among the participants when caring for a seriously injured individual with life-threatening injuries, as Hal et al. (2013) also highlighted in their study. One possible explanation for this uncertainty, in our view, could be a sense of lacking the right first aid knowledge. In our study, participants provided insights that align with this explanation of inadequate knowledge. They expressed uncertainty about necessary actions in critical life-saving situations, such as handling severe bleeding or an unconscious person. Our results emphasize the idea that knowledge and experience can alleviate laypeople's fears, increase the likelihood of them taking action, and initiating life-saving actions while waiting for an ambulance. This concept is also supported by Kulnik et al. (2019).

Collaboration with rescue personnel began as soon as the participants dialed the emergency number 112. They felt a sense of relief knowing that help was on the way. However, their insecurity grew as they had to wait for the ambulance for an extended period. We interpret that the wait for the ambulance encouraged the participants to cooperate with and engage in the advice and support of the dispatcher. The participants described this collaboration as mutual, where they could also support the dispatcher by describing the incident and explaining the location of the injury site to facilitate the arrival of the ambulance.

When the ambulance arrived, the participants experienced an overall sense of calm, and they willingly handed over their responsibilities to the ambulance personnel. The participants shared their experiences of completely trusting the ambulance and rescue services and physically leaving the scene. The participants mentioned that the professionalism and calm demeanor of the ambulance and rescue service personnel encouraged them to stay and assist in ongoing rescue efforts. We posit that this collaboration requires mu-

tual understanding from all organizations, including construction workers, dispatcher, ambulance, and rescue services. It is especially important for professional organizations, including ambulance services, to recognize that involved laypersons are vulnerable and may require support.

After the injury event, participants experienced a strong desire to inquire about each other's well-being and seek external support from the company's management team. Some participants also began reflecting on their actions and questioning whether they had done enough or potentially worsened the injury. We believe that this self-doubt can be the onset of inner stress, a common feeling reported in previous studies (Brinkrolf et al., 2021; Kulnik et al., 2019). The effects of these reactions extended beyond the initial days following the injury event. Several participants shared that the event continued to occupy their thoughts and affect them in the long term. This phenomenon is described by Torun-Mathiesen et al. (2016) who highlight how individuals involved in critical situations outside a hospital setting can experience lasting emotional effects and may struggle to adapt to life after the event.

Reflection over the injury event subsequently led to suggestions for new ways to organize and educate employees, as well as improve equipment to better handle traumatic injuries, and to prepare the organization for worst-case scenarios. Through this result, we believe that the organization can prepare for the worst by, as step 1, linking risk to an action plan. Step 2 involves adapting training based on the organization's expected needs and challenges, as highlighted in previous research (Lingard et al., 2001; Reason., 1998; Salas et al., 2005). Our findings also support the need to prepare the organization for what needs to be done after the injury event. Without psychosocial support, the risk of long-term negative consequences for the personnel who acted as first responders in a serious injury event increases our findings respond to several research reports (Goralnick et al., 2018; Landgraf et al., 2019; Linderoth et al., 2021; Møller et al., 2014). Through our result, we have been able to describe a group of personnel who were strongly affected by having to participate in the rescue of colleagues who were injured in a serious injury event. We believe that, through this impact, the participants have learned and gained new experiences that we hope have strengthened their ability to have the courage to act if they find themselves in a situation where they need to save lives.

METHODOLOGICAL CONSIDERATIONS

In qualitative research and analysis, various methods are employed to gain knowledge. The initial steps in analyzing the collected data are similar regardless of the qualitative method used, involving processes of sorting, and categorizing the information (Graneheim et al., 2004, 2017).

An important concept in qualitative study findings is trustworthiness, which is a summary of various aspects of credibility, reliability, and transferability (Graneheim et al., 2017). The trustworthiness of this study was strengthened by active participation of multiple researchers in the interview process and continuous presence throughout the entire analysis phase.

LIMITATIONS

Regarding the transferability of the results, it is notable that the participant sample size was small despite attempts to recruit more. According to Polit & Beck (2017), participants in studies who choose to express and reflect on their experiences can create data saturation with a relatively small sample. After seven interviews we did not encounter any new variation in the narrative themes. Additionally, two further interviews were conducted, both of which yielded no new variation. It is worth noting that discussion of, or revisiting their experiences, was expected to be sensitive for some participants, especially regarding uncertainty surrounding rightness or wrongness of actions in the described events. This also implies a potential risk that participants may not have fully shared their innermost experiences and reactions to the events, which could impact on the credibility and reliability of the findings here.

CONCLUSION

The results show the challenges for a layperson to switch from being an employee on a construction site trying to understand when a serious injury event has occurred and then change roles to trying to save lives. Their intervention can potentially affect the individual both in the short and long term after the injury event. To prevent short-term and long-term negative stress reactions, some preparation should provide benefit, for example in terms of job-based education or training in first aid. We believe that in complex environments and responses, such as at construction sites, there is a need for mutual understanding between dispatcher, ambulance services, rescue services, and laypersons to support the layperson in becoming a valuable resource to the emergency personnel in serious workplace injury events.

REFERENCES

- Bakke, H. K., Steinvik, T., Eidissen, S. I., Gilbert, M., & Wisborg, T. (2015). Bystander first aid in trauma - prevalence and quality: A prospective observational study. *Acta Anaesthesiologica Scandinavica*, 59(9), 1187–1193. <https://doi.org/10.1111/aas.12561>
- Berglund, L., Johansson, M., Nygren, M., Samuelson, B., Stenberg, M., & Johansson, J. (2021). Occupational accidents in Swedish construction trades. *International Journal of Occupational Safety and Ergonomics*, 27(2), 552–561. <https://doi.org/10.1080/10803548.2019.1598123>
- Brinkrolf, P., Metelmann, B., Metelmann, C., Baumgarten, M., Scharte, C., Zarbock, A., Hahnenkamp, K., & Boh, A. (2021). One out of three bystanders of out-of-hospital cardiac arrests shows signs of pathological psychological processing weeks after the incident - results from structured telephone interviews. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 29(1), 131. <https://doi.org/10.1186/s13049-021-00945-8>
- Duut, M. S., Okyere, P., Zakariah, A. N., Donkor, P., & Mock, C. (2022). Factors influencing willingness to intervene as bystanders among adult residents living in crash-prone areas in the Ashanti region of Ghana. *African Journal of Emergency Medicine*, 12(4), 315–320. <https://doi.org/10.1016/j.afjem.2022.06.010>
- Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., & Kainbacher, M. (2011). The bystander-effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin*, 137(4), 517–537. <https://doi.org/10.1037/a0023304>

- Goralnick, E., Chaudhary, M. A., McCarty, J. C., Caterson, E. J., Goldberg, S. A., Herrera-Escobar, J. P., McDonald, M., Lipsitz, S., & Haider, A.H. (2018). Effectiveness of instructional interventions for hemorrhage control readiness for laypersons in the public access and tourniquet training study (PATTs): A randomized clinical trial. *JAMA Surgery*, 153(9), 791–799. <https://doi.org/10.1001/jamasurg.2018.1099>
- Graneheim, U. H., Lindgren, B. M., & Lundman, B. (2017). Methodological challenges in qualitative content analysis: A discussion paper. *Nurse Education Today*, 56, 29–34. <https://doi.org/10.1016/j.nedt.2017.06.002>
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105–112. <https://doi.org/10.1016/j.nedt.2003.10.001>
- Hall, A., Wooton, K., & Hutton, A. (2013). Bystander experiences at and after a motor vehicle accident: A review of the literature. *Australasian Journal of Paramedicine*, 10, 1–10. <https://doi.org/10.33151/ajp.10.4.54>
- Hansen, P. W., Schlünssen, V., Fonager, K., Bønløkke, J. H., Hansen, C. D., & Bøggild, H. (2022). Association of perceived work pace and physical work demands with occupational accidents: A cross-sectional study of ageing male construction workers in Denmark. *BMC Public Health*, 22(1), 18. <https://doi.org/10.1186/s12889-021-12461-6>
- Kulnik, S. T., Halter, M., Hilton, A., Baron, A., Garner, S., Jarman, H., Klaasen, B., & Oliver, E. (2019). Confidence and willingness among laypersons in the UK to act in a head injury situation: A qualitative focus group study. *BMJ Open*, 9(11). <https://doi.org/10.1136/bmjopen-2019-033531>
- Landgraf, P., Spies, C., Lawatscheck, R., Luz, M., Wernecke, K. D., & Schröder, T. (2019). Does telemedical support of first responders improve guideline adherence in an offshore emergency scenario? A simulator-based prospective study. *BMJ Open*, 9(8). <https://doi.org/10.1136/bmjopen-2018-027563>
- Lennquist, S. (Ed.). (2017). *Traumatologi* (2nd ed.). Liber.
- Lingard, H. (2001). The effect of first aid training on objective safety behaviour in Australian small business construction firms. *Construction Management and Economics*, 19(6), 611–618. <https://doi.org/10.1080/01446190110049820>
- Linderoth, G., Lippert, F., Østergaard, D., Ersbøll, A. K., Meyhoff, C. S., Folke, F., & Christensen, H.C. (2021). Live video from bystanders' smartphones to medical dispatchers in real emergencies. *BMC Emergency Medicine*, 21(1), 101. <https://doi.org/10.1186/s12873-021-00493-5>
- Linderoth, G., Rosenkrantz, O., Lippert, F., Østergaard, D., Ersbøll, A. K., Meyhoff, C. S., Folke, F., & Christensen, H.C.. (2021). Live video from bystanders' smartphones to improve cardiopulmonary resuscitation. *Resuscitation*, 168, 35–43. <https://doi.org/10.1016/j.resuscitation.2021.08.048>
- Mathiesen, W. T., Bjørshol, C. A., Braut, G. S., & Søreide, E. (2016). Reactions and coping strategies in lay rescuers who have provided CPR to out-of-hospital cardiac arrest victims: A qualitative study. *BMJ Open*, 6(5). <https://doi.org/10.1136/bmjopen-2015-010671>
- Møller, T. P., Hansen, C. M., Fjordholt, M., Pedersen, B. D., Østergaard, D., & Lippert, F. K. (2014). Debriefing bystanders of out-of-hospital cardiac arrest is valuable. *Resuscitation*, 85(11), 1504–1511. <https://doi.org/10.1016/j.resuscitation.2014.08.006>
- Perlman, A., Sacks, R., & Barak, R. (2014). Hazard recognition and risk perception in construction. *Safety Science*, 64, 22–31. <https://doi.org/10.1016/j.ssci.2013.11.019>

- Pham, H., Puckett, Y., & Dissanaikie, S. (2017). Faster on-scene times associated with decreased mortality in helicopter emergency medical services (HEMS) transported trauma patients. *Trauma Surgery & Acute Care Open*, 2(1). <https://doi.org/10.1136/tsaco-2017-000122>
- Polit, D. F., & Beck, C. T. (2022). *Study guide for essentials of nursing research: Appraising evidence for nursing practice* (10th ed.). Wolters Kluwer.
- Reason, J. (1998). Achieving a safe culture: Theory and practice. *Work & Stress*, 12(3), 293–306. <https://doi.org/10.1080/02678379808256868>
- Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a “Big Five” in teamwork? *Small Group Research*, 36(5), 555–599. <https://doi.org/10.1177/1046496405277134>
- Sepahvand, E., Khankeh, H., Hosseini, M., & Akhabari, B. (2020). A concept analysis of the bystander effect in road traffic injuries: A hybrid model. *Australasian Journal of Paramedicine*, 17. <https://ajp.paramedics.org/index.php/ajp/article/view/736>
- Sepahvand, M. J., Nourozi, K., Khankeh, H., Mohammadi-Shahboulaghi, F., & Fallahi-Khoshknab, M. (2023). Fears and concerns of bystanders to help people injured in traffic accidents: A qualitative descriptive study. *Emergency Medicine International*, 2023, 1862802. <https://doi.org/10.1155/2023/1862802>
- Tannvik, T. D., Bakke, H. K., & Wisborg, T. (2012). A systematic literature review on first aid provided by laypeople to trauma victims. *Acta Anaesthesiologica Scandinavica*, 56(10), 1222–1227. <https://doi.org/10.1111/j.1399-6576.2012.02739.x>
- Ter Avest, E., Lambert, E., de Coverly, R., Tucker, H., Griggs, J., Wilson, M. H., Ghorbangholi, A., Williams, J., & Lyon, R.M. (2019). Live video footage from scene to aid helicopter emergency medical service dispatch: A feasibility study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 27(1), 55. <https://doi.org/10.1186/s13049-019-0632-4>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal of Quality in Health Care*, 19(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>
- Winge, S., Albrechtsen, E., & Mostue, B. A. (2019). Causal factors and connections in construction accidents. *Safety Science*, 112, 130–141. <https://doi.org/10.1016/j.ssci.2018.10.015>