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Debriefing bystanders of out-of-hospital cardiac arrest is valuable☆

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ABSTRACT

Aim of the study: To explore the concept of debriefing bystanders after participating in an out-of-hospital cardiac arrest resuscitation attempt including (1) bystanders' most commonly addressed reactions after participating in a resuscitation attempt when receiving debriefing from medical dispatchers; (2) their perception of effects of receiving debriefing and (3) bystanders' recommendations for a systematic debriefing concept.
Methods: Qualitative study based on telephone debriefing to bystanders and interviews with bystanders who received debriefing. Data was analyzed using the phenomenological approach.
Results: Six themes emerged from analysis of debriefing audio files: (1) identification of OHCA; (2) emotional and perceptual experience with OHCA; (3) collaboration with healthcare professionals; (4) patients outcome; (5) coping with the experience and (6) general reflections. When evaluating the concept, bystanders expressed positive short term effect of receiving debriefing and a retention of this effect after two months. Recommendations for a future debriefing concept were given.
Conclusion: Debriefing by emergency medical dispatchers to OHCA bystanders stimulates reflection, positively influencing the ability to cope with the emotional reactions and the cognitive perception of own performance and motivates improvement of CPR skills. Importantly, it increases confidence to provide CPR in the future. Implementation of telephone debriefing to bystanders at Emergency Medical Dispatch Centres is a low complexity and a low cost intervention though the logistic challenges have to be considered.

1. Introduction

Survival after out of hospital cardiac arrest (OHCA) is highly associated with bystanders' active role in recognizing cardiac arrest, calling the emergency medical dispatch centre (EMD), performing cardiopulmonary resuscitation (CPR) and using an automated external defibrillator (AED).[1–4] Former studies have identified fear of harming the patient, the concern for incorrect CPR performance, fear of lawsuit if the intervention is not successful and the risk of infectious disease transmission as bystanders' hypothetical barriers to initiating CPR.[5,6] However, little is known about what bystanders thought or feared during the resuscitation attempt and how they reacted afterward. It is likely that witnessing an OHCA affects bystanders emotionally and leaves unanswered questions about own performance. This assumption is supported by a study in which bystanders' perception of their CPR was described as "to feel exposed" in sense of feeling deserted, powerless, ambivalent (what is morally and medically right or wrong in the situation), uncertain and to experience repugnance in the situation.[7] Another study highlighted bystanders' positive attitudes toward debriefing.[8] To our knowledge, no studies have explored the opportunity and concept of systematic debriefing to bystanders after participating in a resuscitation attempt and the effects debriefing might have.

The purpose of this study was to explore the concept of debriefing bystanders after participating in an OHCA resuscitation attempt including (1) bystanders' most commonly addressed reactions when receiving debriefing from medical dispatchers; (2) bystanders' perception of debriefing effects and (3) bystanders' recommendations for a systematic debriefing concept.

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2. Methods

2.1. Setting

In Denmark, there is a single phone number (112) to an emergency call centre that identifies the need for police, fire or medical assistance. In case of a medical problem, the caller is re-directed to an Emergency Medical Dispatch Centre (EMD) that answers, processes and responds to the call by activating the appropriate Emergency Medical Services (EMS). The medical dispatchers are specially trained nurses or paramedics. Their decision-making process is supported by a criteria-based, nationwide Emergency Medical Dispatch System (Danish Index for Emergency Care.[9] In case of OHCA, the medical dispatchers guide the bystanders to perform CPR and to localize and use the nearest AED, according to international guidelines. The protocol includes telephone assisted CPR according to the European Resuscitation Council 2010 Guidelines until arrival of the ambulance.[10]

The study took place in the Capital Region of Denmark with a population of 1.7 million. The EMD responds to about 110,000 emergency calls annually. The emergency medical response is two-tiered. In all cases of suspected OHCA, an ambulance with paramedics and a physician-staffed mobile emergency care unit are dispatched simultaneously.

2.2. Study design

To provide a more in-depth understanding of bystanders' experience with OHCA and perception of telephone debriefing, the study was designed as an explorative interview study based on individual telephone interviews.[11] The study was conducted in two steps; (1) telephone debriefing to bystanders after OHCA and (2) bystanders' evaluation of the telephone debriefing. Both were conducted using predefined guides. All audio files were transcribed ad verbatim. The total study period was from March to July 2013 including telephone debriefing and evaluation interviews. The length of the study period was determined by the practical and organizational frame of the project.

2.3. Providing debriefing

Debriefing was provided according to principles of adult learning based on the hypothesis that debriefing can create reflections of own resuscitation skills. A guide for the medical dispatchers' debriefing to bystanders was adapted from methods within the field of medical simulation where reflections on own practice is a crucial step in the experiential learning process and debriefing helps learners develop and integrate insights from direct experience into later action.[12,13] We applied a feedback element to the debriefing guide in terms of offering "ad hoc" feedback on the performance, but only if the bystander expressed a need for it. The feedback was concrete information about bystander action, making it possible for the bystander to modify the next resuscitation attempt. The medical dispatchers were also informed of possible warning signs for lack of coping strategy and were instructed to assess these during the debriefing interview. Prior to the study period, the debriefing guide was pilot tested on three healthcare professionals and one bystander and consequently developed. The dispatchers were introduced to the project at a meeting where the debriefing guide was introduced and guidelines for using it were discussed. During the study period the project manager had frequent correspondence with the dispatchers and the debriefing guide was adjusted when inappropriateness was identified. Changes were communicated to the dispatchers in a weekly project newsletter and any uncertainties resolved through emails. See Fig. 1 for debriefing guide.

Twelve medical dispatchers were recruited from the EMD to provide debriefing during the study period. Bystanders were recruited at the end of each call with suspected OHCA after the ambulance had arrived at the OHCA scene. The medical dispatcher offered the caller telephone debriefing within 2–4 days after the resuscitation attempt. The caller was asked to extend this offer to all bystanders at the OHCA scene. When bystanders agreed to be contacted for debriefing, the name and telephone number were registered in the study protocol. All medical dispatchers participating in the study were then responsible for contacting bystanders for debriefing within 2–4 days, regardless of whether the medical dispatcher had the primary OHCA call. The telephone debriefing followed the debriefing guide and was initiated by letting the bystander describe their experience with the OHCA scenario from their own perspective. Coping strategies and issues that seemed to have a deeper impact on the individual bystander were then explored. If the medical dispatcher had the impression that a bystander lacked strategies to cope with the experience, they advised the bystander to contact his or her general practitioner. Bystanders were offered a dedicated phone number to the EMD in the end of the debriefing, in case of further questions or need of additional help

To ensure inclusion of the most representative sample of bystanders, everyone participating in or witnessing the resuscitation attempt was invited to participate in the study, regardless of their role. The cardiac arrest victims' relatives were excluded due to the hypothesis that relatives struggle with sorrow and more severe shock, and therefore may be in need of another type of help than the emergency medical dispatchers could offer.

2.4. Evaluation of telephone debriefing through semi-structured interviews

A purposive sample of 15 bystanders who received telephone debriefing during the study period was invited to participate in a research interview about their perception of receiving debriefing and evaluation of the concept. Two of the researchers (TPM, CMH) conducted semi-structured telephone interviews 1–2 months after the debriefing, using an interview guide (Fig. 2) developed by internal discussion in the research group and using topics related to our research question. The guide was pilot tested on the first interviewee and adjusted accordingly.

2.5. Analysis

A phenomenological approach were used for data analysis, as described by Giorgi, modified by Malterud.[14] This philosophy is widely used and suited for development of descriptions and notions related to human experience. Qualitative research uses analytical categories to describe and explain social phenomena.[15] To extract those categories, we used systematic text condensing.[16] Fig. 3 illustrates the analytical steps.

2.6. Ethical approval

Ethical approval was not needed for this study, Biomedical Research Committee in the Capital Region of Denmark, nr. **H-3-2013-FSP 14**. All participants gave verbal informed consent.

3. Results

3.1. Telephone debriefing

All bystanders ($n = 33$) who were offered debriefing agreed to participate in the study and received telephone-debriefing from 9 medical dispatchers. The median number of debriefing interviews

Introduction	• ”My name is ... I am calling from the Emergency Medical Dispatch Centre in the Capital Region of Denmark” • “I am calling you to catch up on the experience you had with participating in an attempt to resuscitate a person with cardiac arrest the other day, where you made the emergency call 112 / helped with cardio pulmonary resuscitation / witnessed a cardiac arrest”
Frame	• “Is it okay to talk right now?” • “Can we talk undisturbed?” • “Our phone call is audio recorded – the audio file will be treated confidentially and is used for research and development only”
Description of experience with out of hospital cardiac arrest	*Main question:* • “Please tell in your own words what you experienced from the very beginning to the ambulance crew left the scene…” (break – let the layman speak freely). In the box, it is noted what to catch up on later in the interview *Additional questions (if needed)*: ➢ ”what did you do after the ambulance left the scene?” ➢ ”Did you speak to anyone about the experience – who?” ➢ “Do you have anyone to talk to about such experiences if you need it?”
Debriefing and feedback	• Now catch up on the themes that need to be explored further, noted in the laymans description of the experience… e.g: “you told me that you have trouble sleeping at night – can you elaborate a bit more on that?” • Confirm to the layman that he/she has done a great job – everyone has done a good job regardless of their role in the attempt to resuscitate
Closure	• ”Before ending the call, I would like to know: Is there anything else you want to add or ask me about?” • The phone number to the daily medical leader of the Emergency Medical Dispatch Centre is given to the layman and he is ensured that he can call anytime with any sort of question/problem • “Thank you very much for participating”

Fig. 1. Debriefing guide used by medical dispatchers when providing debriefing to bystanders.

Introduction	• I am calling because you participated in a resuscitation attempt the (date) and afterwards agreed to participate in an evaluation interview. • Is the timing okay? • Can we talk undisturbed?
The importance of receiving debriefing from a health care professional from the Emergency Medical Dispatch Centre	• What did it mean for you to have the opportunity for debriefing after participating in a resuscitation attempt? *Supplemental questions (if needed)* - Short term effect? - Long term effect? - If you didn’t have the opportunity for debriefing, how would you cope with the experience?
Experience for the future	• What reflections do you have, if any, about participating in resuscitation attempt another time? • Does debriefing change anything regarding your way of acting in such a situation?
Evaluation of concept	• Was the time from the OHCA to telephone debriefing sufficient? • How was the time used in the telephone debriefing? • Were there anything important you didn’t talk about? • Any ideas for the future concept of debriefing bystanders?
Additional questions	• Other considerations you would like to add? • Any questions?

Fig. 2. Interview guide to bystanders who received debriefing after an OHCA resuscitation attempt.

Analysis step	Task
Step 1	All audio-files were listened through by the main author (TPM). In addition, the main author and one investigator (TPM and CMH) read all the transcripts to get a total impression of the data and create preliminary themes related to the study aims.
Step 2	Identification and coding of text fragments that contained information about the research question were performed. Only text fragments with contextual relevance were coded (TPM and CMH). After coding, themes and coding procedure for the first 5 transcripts were discussed (TPM, CMH and BDP) in a consensus meeting.
Step 3	Systematic abstraction of the text fragments within the code groups were done by creating a condensate maintaining, as far as possible, the original terminology applied by the participants. Authentic illustrative quotations were also identified. This was done for each of the code groups (TPM).
Step 4	In order to conceptualize the data, an analytic text for each main theme was written making sure that the synthesized results still reflected the validity and wholeness of their original context (TPM).

Fig. 3. Data analysis steps.

performed was 2 (range 1–9), with a median length of 15 min (range 6–39 min). Audio files were available in 29 of the cases and included in the phenomenological analysis. The demography characteristics of the 33 participants are shown in Table 1.

Six main themes addressed by bystanders during debriefing were identified. Themes and best exemplifying citations are presented in Table 2; *(1) Identification of cardiac arrest*, which could be challenging, especially regarding signs of breathing and consciousness. *(2) Emotional and perceptual experience with OHCA*, and the perceived discrepancy between what bystanders anticipated after previous BLS courses and actual experience; this could be a barrier to initiating and performing CPR. *(3) Collaboration with healthcare professionals*, where challenges and promoters for a good collaboration with the emergency alarm system, medical dispatchers and ambulance crew were addressed. *(4) Patients' outcome*, identified as an important issue since it could be perceived as an indicator of own performance. *(5) Coping with the OHCA experience*, achievable for most through help from friends and relatives. Very few reported the need for additional support from professionals, e.g. psychologists or general practitioners. *(6) Reflections* covered a wide spectrum of thoughts, e.g. rationale for actions, what more could have been done in the situation, how to optimize skills and existential thoughts. See supplemental text for a detailed description of the themes.

Table 1
Demography bystanders receiving debriefing, $n = 33$[#].

	Number (%)
Bystander gender	
F	16 (48)
Bystanders role in OHCA situation	
Caller	12 (36)
CPR performer	9 (27)
Caller and CPR performer	10 (30)
AED provider	2 (6)
Bystanders experience with CPR	
Attended a CPR-course	22 (67)
Never attended a CPR-course	4 (12)
Unknown	7 (21)
Patient gender	
F	16 (48)
Patient age[*]	
Younger	3 (10)
Older	30 (90)
Patient's primary outcome[*]	
ROSC at scene	12 (36)
Declared dead at scene	17 (52)
Unknown	4 (12)
Patient's relation to the bystander	
Friend	2 (6)
Colleague	2 (6)
Neighbor	6 (18)
Person seen before by the bystander	11 (33)
Randomly bypassing person	12 (36)

[#] Demography table created from audiofiles where possible ($n = 29$). For the remaining 4, field notes were used.
[*] Reported by the bystanders interviewed.

3.2. Bystanders' evaluation of telephone debriefing

Citations that best illustrate short-term effects, retention of effects after two months and bystanders' reflections about the resuscitation attempt are presented in Table 3.

3.2.1. Short-term effect of debriefing

Bystanders identified three main short term effects of debriefing: *(1) Safety net*, since the prospect of a telephone call by a professional provided comfort in case of severe psychological reactions; *(2) Emotional relief* because of the opportunity to address the immediate reaction and *(3) The importance of receiving debriefing by a healthcare professional*, since they know the setting and the contextual workflow of OHCA resuscitation and can therefore relate to the situation and answer specific OHCA questions. The latter was described as the major difference and benefit compared to talking to friends and relatives. Other short-term effects were relief to know that they hadn't done anything wrong, leading to inner peace and security, and being able to address the potential feeling of guilt. Few bystanders from our sample did not feel the need for debriefing.

3.2.2. Retention of effects after two months

Three main themes were identified when exploring the retention of debriefing effects after two months: *(1) Emotional benefits*, since debriefing stimulated reflection, positively influencing the ability to cope with emotional reactions and cognitive perception of own performance; *(2) Confidence in own skills*, due to assertiveness resulting from the opportunity to clarify uncertainties about the resuscitation attempt and a gained confidence in initiating CPR; *(3) Keeping up to date* because of reflections on improvement of individual performance in the future and also on how to disseminate gained knowledge.

3.2.3. Bystanders' reflections about resuscitation experiences

The interviewed bystanders still reflected about their experience in participating in a resuscitation attempt despite the interview being conducted 1–2 months after the OHCA. Many

Table 2
Themes and best illustrating citations from telephone debriefing. The themes are presented in the left column. The key themes are in bold. The right column contains citations from the telephone debriefing illustrating each theme and sub theme. = break; (. . .) = text is shortened.

Identification of OHCA*	
Consciousness	[INT 1]"she was lying on her back. And was not well, that was obvious (. . .). She was not conscious, but there was a sort of breathing. It was quite obvious she was really not well"
Breathing	[INT 6]"He had already initiated CPR. But, you know, on and off, because she was gasping. It was as if she exhaled more than she inhaled. And I noticed that her mouth was frothing and her eyes were open, there was no pupillary movement and no such thing as blinking or anything"
Emotional and perceptual experience with OHCA	
Perceptions	[INT 24]"One has to be prepared for what one might see. (. . .) and that a person can look strange even if he or she hasn't been dead for many hours. And that it is possible to be cold, even though you're not really dead yet. And such basic things. You just have to go down on the floor and get started (with CPR).(. . .), it should be very simple, you have to know that it may be disgusting"
Discrepancy between BLS courses and real life scenario	[INT 4]"When you learned it (CPR) in the military, many years ago, you practiced on a mannequin. And there, you don't get the same impression of what actually will happen"
Collaboration with health care professionals	
Common call centre	[INT 7]"The only thing, when calling 112#, you get a little frustrated or a little annoyed in the situation. I know it's a stressful situation. But then they tell you: "in a moment you will be redirected to a nurse". That is not what you want to hear, I'd say, because then your only need is to know that an ambulance is on its way. And that it will come quickly. What I'm saying is, when I called, I was told in a rough tone that I had to wait for a moment, which is not okay, I think"
Emergency Medical Dispatch Centre	[INT 26]"It was very good actually. She told me how I should do, or if I what I was doing was right. It was very nice to have support, even though it was not right next to me, it was through the telephone. So I did not feel all alone. (. . .). When I was in the situation I just thought: "what can I do?" (. . .) But then she said: "you have to perform CPR" and then I thought: "I will do it." (. . .). Otherwise I don't know how I would have reacted. It gave me a sense of an inner peace"
Ambulance crew	[INT 10]"It was very nice that the physician calmly talked to the people involved, while the other staff was packing up the patient (. . .) then he told me that my performance was perfect and I had given him (the patient) a very good chance"
Patient outcome	[INT 7] "(. . .) I do not know the man (. . .) and it doesn't matter to me, but for one's own sake and self-perception and trying to understand whether you've done a good job and if your efforts have been successful, It would have been nice to know, but I have to do without."
Coping with the experience with OHCA	
Individual level	[INT 26]"I spoke to my mother-in-law about it. I just told her what happened. I just had to calm down and so on. I was still shaken. She said: "it happens, it's old people, it can happen, after all (. . .). So I am a bit more calm now (. . .)"
Collaborative level	[INT 11]"We simply closed our department afterwards and talked about it and asked everyone to spend the night with friends or family so they didn't have to spend the night alone. No matter how cool they were. (. . .). Because then it doesn't stay in your mind and body (. . .). I think we talked it through and ended it in a good way.
Reflexions	
Rationale for actions	[INT 11]"It's been many years since I've been in the military and it is many years since I have had basic life support training, but apparently, it occurs automatically–this behavioral pattern." [INT 26] "I've always been the type of person who just jumped into things and then we must take It from there. We should not be afraid of anything. [INT 18] "(. . .) I have taken two basic life support courses, however a while ago, but the man who performed CPR didn't do the things that I have learned, he held his hands next to each other and not on top of each other, and he just pressed a little in depth. I asked if I should take over, because he said that he never had tried it before. I hadn't either, but I tried in on a course. (. . .)
What more could have been done	[INT 20] "I stood at the window, because we were two people. And I did not really manage to call for help and I didn't manage to. . . Actually, we have an AED here, but I didn't. . ., It didn't go through my mind at all (. . .). No, I didn't even think about using it"
How to optimize skills in the future	[INT 12] "(. . .) we have a lot of things going on (on the workplace) regarding basic life support and, if we ought to have an AED, because we don't have one. We have a lot of thoughts and ideas about what we should and shouldn't do in the future (. . .). And we pressure our manager a little, because we think that we need a basic life support course."
Existential thoughts	[INT 21] "I also think it was good timing (. . .), it might have happened the day before or an hour later, when he would be driving in the truck, right? So we've talked a lot about that. Luckily, it happened right there after all." [INT 26]"you know what, it does not matter, it can happen. So all die at some point after all. So whether it's today or tomorrow not. Whether young or old."

* Out of hospital cardiac arrest.
# 112 = emergency call number in Denmark.

addressed the major gap between their expectations to OHCA and actual experiences. BLS courses were described as being too superficial and lacking preparation on how the OHCA situation and resuscitation attempt can go beyond the related practicalities, but may also comprise unpleasant reactions and a stressful atmosphere, which needs to be overcome in order to react.

3.2.4. Bystanders' practical considerations on a systematic debriefing concept

Bystanders reported it was crucial to be contacted by the healthcare professionals and not having to take the initiative to make the call to the EMD themselves. They all expressed that asking for help would be a barrier. Debriefing after 2–4 days was reported appropriate. It was important to have a phone number to the EMD and to know that it was expected of them to call back in case of a need for further clarification and served as an important safety net. It was agreed that the content of the conversation was adequate, and that a positive, listening and curious approach by the healthcare professionals was successful. Finally, bystanders emphasized the importance of the interviewer's good communicative and empathic skills, especially in order to identify people with additional need for help from their general practitioner or a psychologist.

Table 3
Themes and best illustrating citations from evaluation interviews with bystanders about effects of receiving debriefing. The key themes are in bold. The right column contains citations from the debriefing interviews illustrating each theme and sub theme. = break (. . .) = text is shortened.

Short term effects	
Safety net	[INT 9] "It made me feel secure about. It was really nice to know that I would be called back. Because I did not actually know how I would react to such things. So it was a kind of an insurance for myself, that if anything would happen, for example if unpleasant thoughts would come up, I knew that I would be called back (. . .) I knew that I would be helped to my feet again (. . .). That was really really nice.
Emotional relief	[INT 5] "That was very good, because it was a first time experience. I had never tried it before, so I was shocked that day (. . .)- that she called back, because I had a bad conscience - what could I have done more and things like that. And I thought about whether what I had done was good enough, and having that conversation with the nurse afterwards that I had done well enough and I could not have done more. It was actually very nice to hear and be reassured about what I did was good enough." [INT 15] "It was a kind of first aid to me and I liked that. (. . .) Because when standing in the middle of it all and experiencing all that, the ambulance crew have to help other people. But no one helped me."
The importance of receiving debriefing from a healthcare professional	[INT 2] "I cannot speak to a friend the same way I spoke to the nurse. I don't think so; I think it was nice to talk to a professional who knows what it is about 100 percent. It's fine that you can sit down and talk to a friend but people who haven't experienced it or know what it is about do not really understand it."
Retention of debriefing effect after two months	
Emotional benefits	[INT 14] "When you get to cope sooner, then you don't carry the situation the same way. (. . .) and may be more capable to react another time (. . .). Because you have been reassured that you did the right thing. Then you don't fear that it was your fault, if the person died"
Confidence in own skills	[INT 9] I've reflected a lot about if what I did was right or wrong (. . .) and how I reacted and how to react another time. (. . .). The debriefing enables me to be more confident in that what I do or have done is right." [INT 1] It didn't affect me so much when I gave her CPR, but after I spoke with you, I reflected on, if I had experienced something that can make me react better the next time I'm in such a situation."
Keeping up to date	[INT 8] "I sometimes think: "what do I have to remember–oh yes - I have to check if the airway is clear before I start CPR," right. It has created an awareness, at my job, about how updated our first aid course is and should we plan to take a new one. And at home–maybe someone might also benefit from it"
Reflections	[INT 5] "You have tried many things on the courses and things like that, it is completely different. There you don't think much about it, then you think "well okay, that's so easy." But to try it in real life–that's entirely different. So I think it was really good to talk about, through the conversation, so how was it in real life." [INT 10] "The first aid courses, they are sometimes a little superficial, I think, and the courses don't prepare people for the trauma of seeing injuries and the fear and panic in people's eyes when it happens.(. . .). It's a special situation for which preparation could be incorporated in the first aid courses, so people don't freeze as much (. . .). There is this anxiety of doing anything when experiencing it for the first time" [INT 10] "If you are trained, but cannot use your skills, then the training is meaningless. You could consider preparing people on how surrealistic a situation it is, for example by showing videos with people who have experienced it, telling about the feelings related to it etc."

4. Discussion

This is the first study to assess which reactions bystanders addressed when receiving debriefing by medical dispatchers, bystanders' perception of short term effects of receiving debriefing, retention of effects and bystanders' recommendations for a systematic debriefing concept. Our main findings were six main themes being addressed: the challenge of identifying OHCA; emotional and perceptual experience; collaboration with healthcare professionals; patient's outcome; coping with the experience and general reflections. When evaluating the concept, bystanders expressed positive effects of receiving debriefing and retention of effects after two months.

Identification of cardiac arrest is crucial for bystander CPR and survival.[1,4,17–19] To identify cardiac arrest, bystanders have to recognize unconsciousness and abnormal breathing, which was challenging in accordance with other studies.[20–22] Bystanders' emotional and perceptual experience with OHCA described the overall impact of experiencing a sudden unexpected and serious situation, which could lead to hesitancy in identifying cardiac arrest and initiating resuscitation. In that context, bystanders expressed a beneficial effect of collaboration with the medical dispatcher. The EMS organization should ensure continuous quality assessment of the emergency call conversation, as this is the only interaction between the bystander and the professional medical dispatcher, who has to be inquiring and supportive in order to obtain the necessary information for decision making and guidance to the bystander in very short space of time.[23]

The outcome of the OHCA victim was perceived as an indicator of own performance for some bystanders. However, confidentiality regarding patient health care does not permit providing information to bystanders about victims' survival status, unless through the victim's given consent. Thus, the emergency dispatcher was unable to attend to this particular need. Systematic information about victims' outcome could be beneficial for some bystanders. However it implies an important ethical aspect. If survival is an essential indicator of a good performance, this positive perception would be rare due to the low survival rate.[1] Importantly, the bystanders expressed relief knowing they had performed optimally and had given the victim a better chance of a good outcome, regardless of the actual outcome.

Overall, no bystanders in our study had severe psychological sequelae after participating in a resuscitation attempt. They showed good coping strategies and had sufficient help from friends

and relatives regarding their emotional reactions. Only two were advised to get further professional help. This finding is in accordance with a previous study, where bystanders' psychological reactions after providing CPR and using an AED were investigated.[24] Notably, the opportunity to talk the situation through with a healthcare professional was viewed as the most important benefit from receiving debriefing. This was considered important in order to gain confidence in own skills to perform CPR in the future and may positively affect how bystanders react to OHCA. This is particularly important in the context of generally increasing bystander CPR and should be explored in future studies.

Bystanders' reflections during telephone debriefing as well as the evaluation interviews provide important knowledge for engaging bystanders in the resuscitation field in general. A discrepancy between bystander anticipation after previous BLS courses and live experience were specifically addressed and may be an important barrier to initiating of CPR. A systematic review identified determinants of low bystander CPR and factors associated with successful training and suggested to inform trainees about what to expect during resuscitation.[3] This supports the idea of further development of existing BLS courses. Our study contributes to our understanding of bystanders' barriers and promoters in different aspects of resuscitation and how this knowledge can be incorporated in future courses and ultimately increase bystander CPR rates.[25]

We found positive short term effects of debriefing provided by medical dispatchers for bystanders and retention of effects after two months. Talking to a health care professional was highly appreciated to clarify specific questions about the OHCA scenario and becoming more confident in own resuscitation skills and ability to react in an emergency situation. Further, debriefing reinforced reflections on own skills and potential for individual and organizational improvement.

In our experience from the study, debriefing performed by healthcare professionals working at emergency medical dispatch centers is a low cost intervention that can affect bystanders' attitude toward resuscitation in OHCA in a positive direction. It may be speculated to have a beneficial effect on medical dispatchers' practice, by contributing to improve understanding of the OHCA situation and bystanders' barriers in future OHCA emergency calls. This argues for the implementation of such initiatives at Emergency Medical Dispatch Centres. The organizational and logistic challenges of implementing systematic debriefing and the importance of proper preparation and daily supervision of the staff in charge of the debriefing must be addressed to ensure sufficient quality.

4.1. Discussion of methods used

One of the strengths of this study is the heterogeneity of the bystanders receiving debriefing. One third were callers without "hands-on." The remainder were either CPR providers or both CPR providers and callers at the same time. This heterogeneity has the potential to reflect bystanders' perception of the OHCA scenario and hence the need for debriefing, regardless of their role in the resuscitation attempt. We included as many bystanders as possible through the person calling for help to the Emergency Medical Dispatch Centre. We do not know however, how the caller recruited bystanders, which may be a limitation of the study. Given the exclusion of the OHCA victims' relatives and that about two thirds of OHCA happens at home,[26] the applicability of the study results is limited to a minority of the population. Further studies should elaborate on our findings and explore relatives to OHCA victims' specific needs after participating in a resuscitation attempt.

In addition, differences in organizational structure of EMS internationally may limit the generalizability of the results and thereby implementation recommendations.

5. Conclusion

Debriefing provided by medical dispatchers to OHCA bystanders contributes to addressing bystanders' emotional reactions and clarification of practical questions. It stimulates reflection, positively influencing the ability to cope with the emotional reactions and the cognitive perception of own performance; enhances motivation to perform CPR and motivates improvement of skills. Overall, it has potential to increase focus on resuscitation and bystander CPR. Implementation of telephone debriefing to bystanders by EMD is a low complexity, low cost intervention, although logistic challenges should be acknowledged.

Conflicts of interest statement

None.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.resuscitation.2014.08.006.

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