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PATIENTS' EXPERIENCES OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

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ABSTRACT

Background: Research on patient safety in Emergency Medical Services (EMS) has mainly focused on the organization and/or the prehospital nurses' perspective. Little is known about how patients experience safety in EMS. This study aims to describe patients' experiences and sense of safety in EMS.

Methods: A qualitative design with individual interviews of EMS patients (n=21) and an inductive qualitative content analysis were used.

Results: Patients' experiences of prehospital nurses' ability or inability to show or use their medical, technical, and driving skills were factors affecting the sense of safety. When patients' perceived a lack of professionalism and knowledge among prehospital nurses, the patients felt unsafe. Patients highlighted equality in the encounter, the quality of the information given by prehospital nurses, and the opportunity to participate in the care as important factors creating a sense of safety during the EMS encounter. Altogether patients' experiences of safety in EMS were connected to their confidence in the prehospital nurses.

Conclusions: Overall, patients felt safe during their EMS encounter, but prehospital nurses' professional competence alone is not enough for patients to feel safe. Lack of communication or professionalism may compromise patients' sense of safety. Further work is needed to explore how patients can be involved in improving safety in EMS.

Keywords: Ambulance service; patient experience; qualitative study; safety; prehospital nurse

Strengths and limitations of this study

- This study reveals what patients consider important for feeling safe in the EMS.
- Interviews offered the opportunity to gain knowledge about patient safety in the EMS from the patients' perspective.
- Patients' feelings of safety in the EMS are related to how well prehospital nurses inspire confidence in their skills.
- Prehospital nurses' professional competence alone is not sufficient for patients to feel safe in the EMS.
- A limitation is that the interviews were done in a small hospital district, which could limit the transferability of the results.

BACKGROUND

"To err is human"[1], but it can at worst cause disastrous results for patients seeking care and for the organization caring for the patients. Systematic development and research are therefore needed to ensure and improve patient safety and quality of care. Errors are described to usually be caused by faulty systems, processes, or conditions in the organization rather than by individual health care workers, and thus, all health care actors, including patients, should be involved in developing the safety culture in health care. Global recommendations and guidelines to improve patient safety include the patients as active team members whenever possible[1-3]. Despite recommendations and guidelines, patients are, however, an underused resource when monitoring safety in health care[4].

The World Health Organization (WHO) defines patient safety as “the prevention of errors and adverse effects to patients associated with health care”, and it has been noted that safety culture in health care affects patient safety[2]. There are also similarities between safety culture and patient safety culture[5-9]. The theories of patient safety culture[5] and safety culture[10,11] are defined as dynamic and multilayered constructs. Researchers have shown that patient safety culture and safety culture both include three inter-related dimensions or levels. The “Organizational dimension” illustrates the actions by which management aims to ensure workplace safety or patient safety. The “Social process” or “group level” represents members’ actions and interactions with others, and the “psychological dimension” or “individual level” involves an individual’s subjective experience and understanding of safety or patient safety[5,10,11]. Considering these safety culture dimensions or levels, it is essential to recognize how these three dimensions or levels affect patients’ experience of safety.

Safety and patient safety in emergency medical services

Emergency medical services (EMS) can be considered a challenging and constantly changing environment compared with other emergency care settings in hospitals. The hospital environment is built for patient care and this environment changes less than EMS. The dynamic environment in EMS could compromise both prehospital nurses' and patients' safety. For example, transporting a patient to hospital by ambulance could be a hazardous situation. The risks of traffic accidents are known to increase if driving with blue lights and sirens [8,12,13].

Patient safety studies within the EMS setting have mainly investigated adverse events, mishaps, near-misses, occupational hazards, and patient safety or quality of care, and these previous studies have mainly focused on the organization or prehospital nurses' perspective and have not included the patients' point of view on safety[14-18]. Patient safety from the patients' viewpoint has mainly been investigated in hospital settings, showing that patients give valuable insights into improving or assessing patient safety[19-22]. As the EMS and hospital environment differs, there is a need to investigate patients' experiences of safety in the EMS. Therefore, the aim of this study was to describe patients' experiences and sense of safety in the EMS.

METHODS

A qualitative study design with individual interviews was used to explore patients' experiences of safety in the EMS.

Setting

The study was carried out in eastern Finland, a health care district covering approximately 132 000 inhabitants. There is one central hospital in the district and ambulance services covers the whole area (6872.10 km²), including both rural and urban regions. Ambulance

transports vary between 1 and over 100 km. In 2017, there were about 22 100 EMS requests in the area according to official statistics. At present (year 2018), there are 11 ambulances, two “one prehospital nurse units” (same equipment as in the ambulance and point-of-care devices, not capable of transporting the patient), and one prehospital nurse officer (operational supervisor of the shift, participates in challenging tasks). All of the ambulances are manned by at least one prehospital nurse qualified in advanced life support techniques and trained to handle mass casualty situations. In Finland, there are advanced-level ambulances and basic-level ambulances. The former is equipped with two prehospital nurses or one prehospital nurse and another qualified person, e.g. nurse or other health care professional or rescue worker. The education level among advanced-level prehospital nurses is at least a registered nurse (210 credits) with advanced life support education (30 credits) or a prehospital nurse with 240 credits. Basic-level ambulances are manned by at least one emergency medical technician (EMT). Another qualified person in a basic-level ambulance can be a nurse, other health care professional, or rescue worker[23,24]. In Finland, the prehospital nurse either drives the ambulance or takes care of the patient during transport. The highest educated ambulance personnel is always responsible for patient care, but when the patient is assessed as low priority, a nurse, EMT, or other health care professional can attend to the patient during transport.

Data collection and participants

Data collection was undertaken at the central hospital emergency department (ED), where patients are transported by EMS. Data were collected via semi-structured interviews during March 2018. The interviews were conducted by the first author, a prehospital nurse with 20 years’ working experience in the EMS, and who has not had any professional or personal contact with the participants beforehand. A purposeful data collection [25] was used, aiming to achieve variation among participants and an information-rich material

without risking patient safety. Inclusion criteria were as follows: the patient was transported by the EMS to the ED after an emergency call to the emergency response centre (ERC) and the patient was assessed as low priority in the ED or the patient's priority was assessed as low after treatment in the ED. Additional inclusion criteria were that the patient was over 18 years of age, sober, and fully understanding and speaking Finnish. Exclusion criteria were that the patient needed urgent treatment in the hospital, was not sober (> 1.0 ‰), or had used other drugs and inter-hospital transports. Additional exclusion criteria were age < 18 years, incapable of communicating in Finnish, or presence of dementia, confusion, or terminal disease. ED nurses identified eligible participants. The first author received a list of eligible participants' from the ED nurse. The first author gave oral and written information about the study and asked about participation after patients had received their initial assessment and treatment at the ED.

In total, 22 patients were asked to participate, 21 of whom agreed to participate in the study. One male refused the interview without providing a reason. All interviews were performed during daytime (between 8 am to 4 pm). The first, second, and last authors (the first and last authors with working experience in EMS as prehospital nurses, and the second author with experience as an EMS physician) together devised the interview questions. The interviews started with an open-ended question "*Can you tell me about your experience of the EMS encounter?"* To encourage patients to share their experiences, additional questions were asked concerning waiting time, assessment, treatment, transportation, and the handover at the ED. The interviews concluded by asking the patients to describe what made them feel safe or insecure during the EMS encounter. The interviews lasted between 10 and 20 minutes. The interviews continued until no more variation among the patients' experiences was identified. All the interviews were recorded with a digital recorder and transcribed

verbatim by the first author. Two of the interviews were translated from Finnish into English to achieve transparency among all authors participating in the study.

Patient and public involvement

Patients or public were not involved in the design and conduct of this study.

Data analysis

An inductive qualitative content analysis was used to analyse the data [26]. The analysis began after all interviews had been listened to and transcribed. The text was then read several times to obtain a sense of the whole and to identify patients' expressions about their experiences of safety and the EMS. All patient-expressed experiences identified were then translated into English by the first author. The experiences were single words or short sentences. In the first phase of open coding, the expressions that were similar received the same open code. The third author, who had no experience in EMS, but had working knowledge of patient safety research, read the transcripts and translated patient-expressed text with the aim of increasing the reliability of the process and verifying the first phase of open coding.

After the open coding, codes were collected into a coding sheet consisting of codes related to each other. These coding sheets were then abstracted into sub-categories, after which the sub-categories were grouped into generic categories and finally into the main category. Generic categories reflect factors that affect patients' sense of safety, and sub-categories indicate the themes on which the main category was formed. During the analysis there was a recurrent movement between the whole, the parts, and the whole. By being close, moving backward and forward in the text during the analysis, the authors were striving to be as reflective and open to the data as possible. The authors also discussed the balance between their pre-understanding and openness to the content during the analysis. In every phase,

the analysis continued after consensus between the researchers was reached. The last phase in the analysis was the conceptualization of the results, displayed in Figure 1.

Ethical considerations

This study was approved by the Ethics Committee of Helsinki University Hospital (HUS/3529/2017). The patients received written information about the study purpose with contact information for the responsible researcher, and they had the possibility to ask questions about the research from the first author. The patients filled out a form affirming their voluntary participation in the study. The patients were informed that they have the right to withdraw from the study at any phase. During the interviews the first author observed the patients and was discontinued the discussion if any changes occurred in the patient's physical or mental condition.

RESULTS

A total of 21 patients participated in the study. Their medical condition was classified in the ED as low priority. The main reason for seeking EMS care was cardiac-related symptoms or breathing difficulties, as displayed in Table 1. Two of the patients did not describe their health problem or the reason for requesting an ambulance.

Table 1. Description of patients.

	Female n=12	Male n=9
Age range (mean)	44–91 (74.5)	41–86 (68.1)

Transported from urban area	7	5
Transported from rural area	5	4
Primary condition assessed by ambulance attendant		
Breathing difficulties	4	1
Cardiac-related symptoms	3	2
Gastrointestinal problems	2	1
Lower body pain	1	1
Minor injury	-	2
Neurological symptoms	-	2
Missing data	-	2

The main category *Patients' confidence in the EMS* is described as prehospital nurses' social skills and contextual factors affecting patients' care and experience of safety. The main category underpinned by the generic categories and sub-categories is displayed in Figure 1. The generic categories with their sub-categories are presented below with illustrative quotations.

Prehospital nurses' social skills

Sub-categories: *Equal treatment, Information,* and *Patients' possibility to influence their care and safety* underpin the generic category of Prehospital nurses' social skills. Equality in the care, the possibility to get information, and opportunity to participate in their care affected patients' sense of safety in EMS. From the patients' point of view, fair treatment was not always the case among prehospital nurses.

Equal treatment

According to the patients, equal treatment and a reliable patient-prehospital nurse relationship generated a sense of safety in the EMS. The patients noted that it is essential that prehospital nurses' behaviour is calm, natural, and friendly. The patients expressed that a bit of humour and small talk during the care lighten the atmosphere and help to create a good patient - prehospital nurse relationship.

"They didn't feel like officials. They were like human to human." (Pt5)

On the other hand, patients described feelings of unfair treatment and insecurity in care when prehospital nurses' behaviour created a sense of being rushed, when the nurses were negative or too official, or when the nurses lacked communication skills. The patients also stated that the prehospital nurses did not always take their concerns seriously and sometimes ignored them altogether. This was reflected in how patients described situations where their mental and/or physical condition created a feeling of insecurity, e.g. if they had difficulties with breathing, felt lonely, or had to wait for the ambulance for a long time. Feeling insecure as a result of unfair treatment caused a sense of being unsafe among the patients.

"*Waiting is the worst, especially if you are alone and there isn't anyone with you" (Pt6)*

"*The journey was unsafe because I had breathing problems" (Pt16)*

Information

Most patients mentioned that the prehospital nurses gave enough information about the measurements, a student participant, environmental conditions, treatment, and medication as well as about driving with lights and sirens on. Also, if the prehospital nurse had contacted the hospital beforehand, the patients expressed that the information had transferred to the hospital personnel. The patients describe that in these situations their treatment in the

hospital started smoothly and quickly. However, some patients described not getting enough information. Usually the lack of information concerned measurements or the patient's medication during care. Even these patients maintained confidence in the prehospital nurses and their professionalism because of the feeling that they received help from EMS personnel. Lack of information thus had negligible impact on patients' feelings of safety in the EMS.

> *"Ambulance personnel interviewed me and they took all sorts of measurements and I don't know all the measurements they took" (Pt13)*

Patients' possibility to influence their care and safety

According to the patients, their possibilities to influence care and safety varied. Patients' possibility to affect their transport position had an impact on their safety experience. Especially those suffering from breathing problems stated that they wanted to sit on the seat rather than lay on the stretcher even if they were placed in an upright position. However, prehospital nurses usually ignored this wish without explaining why it was not possible. Although some of the patients said that they did not have the chance to affect how they were moved to the ambulance or what position or where to stay during the transport, however they did not automatically define this as a negative thing.

> *"They didn't let me walk anymore, they were pushing (with the stretchers) the old granny … it sort of gives a nice feeling that somebody is still taking care of the old granny" (Pt5)*

In some situations, regarding safety, the patients took an active role. For example, they asked the prehospital nurses to put safety belts on or they asked to reduce ambulance speed if they felt that the speed compromised their safety.

"I said that at least put the seatbelt on me. If you drive off the road, I fly out of here (from the stretchers) because I don't have the seatbelt on" (Pt10)

Contextual factors affecting care

Sub-categories: *Society and physical environment,* and *Prehospital nurses' professional competence* and *Prehospital nurses' driving skills* underpin the generic category Contextual factors affecting care. The patients feel that EMS provides an essential public safety function. They also described that the physical environment (e.g. road and weather conditions, ambulance suspension, and conditions inside the ambulance during the transport) affects their experience of safety in the EMS. Prehospital nurses' technical and driving skills were highlighted when the patients talked about their experiences of factors affecting the care and safety in EMS.

Society and physical environment

Society and physical environment markedly affect patients' feelings of safety in EMS. The patients feel that EMS provides an essential public safety function. Almost all of the patients interviewed had some preconceived notions of how the EMS works, expectations based on their own experiences or on how the service has been described in the media. Quick response times increase patients' experience of safety. However, the experience of quick response time varied between the patients. Patients described a feeling of relief and security when the prehospital nurses arrived and brought help to them with good equipment. They mentioned that they felt safe while the ambulance transported them to hospital.

" Because I know that every time when I call an ambulance, help is near" (Pt13)

Some environmental issues reduced patients' feeling of safety or made them uncomfortable. Bad, bumpy roads or poor suspension in the ambulance made patients feel worse during the transport. The experience of feeling bad increased if the temperature was too hot or too

cold during the transport. Uncomfortable and narrow stretchers and difficulties in getting inside the ambulance impair the experience of the care.

> *"Why did the ambulance have such bad and noisy suspension? Was the road so bad or was it the ambulance suspension?" (Pt10)*

Prehospital nurses' professional competence

Patients stated that prehospital nurses' professional competence made them feel safe during care. According to the patients, good professional competence means asking questions related to their health problems, background information about previous illness, medication, home situation, etc., and taking a lot of measurements and giving medication when needed. These factors made the patients feel that the treatment had started immediately, and prehospital nurses were interested in their health problem. Also, the patients mentioned that when prehospital nurses supervised and gave guidance to the student it had an effect on the patient's experience of the prehospital nurse's professional competence. Patients noted that the prehospital nurses mainly had good professional competence from their point of view.

> *"The guys inserted an i.v.* (intravenous cannula) *and did measurements. Very professional personnel inserted the i.v. into my forearm, so they are very well educated" (Pt11)*

> *"They took care of me and measured my blood pressure and gave me the medication orally and that made me feel safe" (Pt8)*

However, some of the patients perceived that prehospital nurses lacked professional competence, and this affected their sense of safety. This situation occurred when prehospital nurses were uncertain of what had caused the patients' health problem or when the patient became aware that the prehospital nurse had a lack of knowledge, e.g. when the

only solution to the patients' problem in the nurses' view was to transport the patient to the hospital. Also, when the prehospital nurses lacked communication skills and were unable to put in an i.v., these were interpreted as a lack of professional competence by the patients. These factors made the patient feel uncertain and unsafe.

> *"They said that they don't understand, and they brought me here (hospital)... they tried to insert an i.v. in my forearm and it failed" (Pt3)*

Prehospital nurses' driving skills

For the most part, the patients felt that the prehospital nurses had good driving skills, reflected in "smooth and fast transportation" or not driving too fast. Also, if the driver took notice of the weather and road conditions and adjusted the driving style to these, the patient had an impression of good driving skills and safe transportation. However, some of the patients felt unsafe and insecure if the ambulance speed was too high, especially if the weather conditions were bad or the roads were slippery or uneven.

> *"The hail was falling, it was the size of ping pong balls, and other cars had stopped at the roadside but the ambulance was going very fast" (Pt10)*

DISCUSSION

In this study, the perception of fairness, the possibility to get information, and the opportunity to participate in care affected the patient's sense of safety in the EMS. A previous study[27] showed that shared information and being treated in a friendly and respectful manner are important when involving patients in patient safety. If the patient feels objectified by the prehospital nurse, this may cause a feeling of "suffering from care"[28], leading to a sense of unsafety. Previous knowledge of patient experiences of safety in hospital settings[19-22] highlights that being treated fairly is important to patients, and based on our findings this is

also true in the context of EMS. If we consider the patient a team member in the EMS rather than a patient or an object, it becomes clear why a good patient-prehospital nurse relationship is so essential to the patient's sense of safety. In the EMS, the prehospital nurse should be considered the team leader who in turn treats the patient like a team member. Edmonson[29] concludes that "the action of team leaders promotes team psychological safety" and "trust and respect in horizontal group relationships promote team psychological safety". These conclusions may help us to understand why patients experience equality, getting enough information, and having an opportunity to participate in care as crucial in feeling safe.

As stated by O'Hara et al.[21], our study also reveals that patient safety is a more critical issue from the patients' perspective than from the perspective of health care workers and organizations. In health care overall and in the EMS setting, it is crucial that health care workers support patient participation and provide relevant information to the patients. According to the conclusions of Sahlström et al.[27] and Edmonson[29], by the prehospital nurses seeing the patient as a team member, they can create a psychologically safe environment for the patients. Patients then are more likely to talk about their concerns, to get an experience of interaction, and to feel safe in the EMS encounter.

O'Hara et al. have shown that most of the patients' safety experiences could not be classified as patient safety issues or adverse events. Despite this, the authors noted that patients' experiences offer a valuable perspective on how health care professionals can develop safety and improve the patient encounter in health care.[21] In our study, we did not classify patients' negative experiences as adverse events, and conversely, having a sense of safety in the EMS is not the same as actually receiving safe care. However, based on patients' experiences, valuable information emerged on how to improve patient safety and the patient encounter in EMS. Some of the patients had experienced, especially with driving, a situation

that could have compromised the safety of the patient and the prehospital nurse. Prehospital nurses' communication (with the patient or other health care professional) and clinical judgment were important when patients described what makes them feel safe when cared for by prehospital nurses. Our findings were similar to those of a review study[31]. In that study, patient safety issues in EMS were categorized into seven different themes: clinical judgment, adverse events and error reporting, communications, ground vehicle safety, aircraft safety, interfacility transport, and field intubation[31]. Furthermore, a study conducted by Togher et al.[32] and also our study emphasizes the importance of a short waiting time, patients' confidence in the prehospital nurses, and prehospital nurses' professional skills and communication. Our study found that these factors also influence patients' safety experience. Even a short waiting time has a marked impact on patients' experience of safety in our study a short waiting time according to patients ranged from a few to 30 minutes.

Overall, the interviewed patients appeared to feel safe in the EMS and to have confidence in EMS personnel. Clearly, confidence in the care provider is the main factor affecting patients' sense of safety in the EMS. In addition, medical knowledge and driving skills are factors directly related to a positive safety experience for the patient. However, prehospital nurses' professional competence and valid driving skills are meaningless in maintaining patients' confidence if the nurse does not treat the patient in a fair and humane manner. Therefore, prehospital nurses should become more aware of their social interactions with patients and the importance of these interactions to patients' perception of safety.

The generic category *Factors affecting patients' sense of participation* reflects both the "social process" or "a group level" and the "psychological dimension" or "an individual level"[5,10,11] and the generic category *Contextual factors affecting care* reflects the "organizational dimension"[5,10,11] Our findings are in line with the inter-related layers

described in patient safety culture and safety culture[5,10,11], but also highlight the gap between what patient safety means to the prehospital nurse or the EMS organization and what patient safety means to the patient. Furthermore, based on this study and a former study[33], prehospital nurses, EMS organizations, and vocational training providers need additional knowledge about other factors affecting patients' safety experience in the EMS. Prehospital nurses require more education to improve their social skills and to be able to foster psychological safety for the patient. The curriculum in nurse training should thus be expanded to include development of social skills.

Study strengths and limitations

It could be a strength or a limitation that the researchers had a deep pre-understanding of the research topic. Deep theoretical and clinical experience helps to understand patients' experiences of the EMS and also to put these into a clinical context. However, this could also cause a bias via a lack of openness to the subject. To reduce this potential bias, we move back and forward between the interviews and the expressions and between the categories and the interviews during the analysis. Also, one of the researchers had no experience with EMS, but had working knowledge of patient safety, and this reduced the risk of bias caused by preconceptions.

The patients were recruited from only one health care district area, which could reduce extrapolation of the results. However, patients' characteristics cover the most common EMS patient groups according to the ERC official statistics. Another limitation is the exclusion criteria; the excluded patients could have valuable insight into how they experience safety when prehospital nurses must use much support equipment and different kinds of transfer methods.

The interviews were performed when the patient was admitted to the ED. This may also be considered a limitation or a strength: a limitation due to the patient's experiences of illness, a strength due to their memory of the prehospital nurses and the EMS encounter being fresh and unaffected by other people's opinions. Because of the timing of the interviews, one might assume that the care in the EMS was still in patients' recent memory. The short duration of the interviews may be a limitation. The reason for short interviews was often the patient's illness or fatigue or the limited experience of the interviewer. However, the interviewer approached the subject with an open question and continued with more specific questions. Therefore, the interviews concluded when no new information emerged.

Even if the interviews were done alone with the patient, it is possible that the patients were hesitant to openly share their views. There could have been barriers to the patients disclosing their concerns caused by for instance "I do not want to be a troublemaker", "I don't know how to raise my concern", or "I do not want to harm my relationship with members of the medical team"[34]. To reduce these concerns, the interviewer introduced herself as a researcher, wore casual attire, and informed the patient that interviews are analysed anonymously. Moreover, we informed the patients that participating or withdrawing or anything that they say will not influence their treatment in the hospital or EMS. Despite certain limitations, this study offers valuable insights into patients' experience of safety in EMS.

CONCLUSIONS

Prehospital nurses' social interactions seem to be associated with patients' experience of safety. Thus, more attention should be directed to prehospital nurses' social skills and their ability to create a psychologically safe environment for the patient. In addition, this study adds knowledge about the factors contributing to or reducing patients' perception of safety

when attended to by prehospital nurses. This information is valuable for development of EMS organizations and protocols, improving their quality and safety performance. However, EMS organizations and prehospital nurses must continue to develop the other elements of patient safety in the EMS.

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CONFLICT OF INTEREST

All authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed to this study as follows: study design (AV, VL, MC), data collection (AV), data analysis (AV, VL, ST), and writing the manuscript (AV, VL, MC, ST). All authors read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The data used and analysed during the study are available from the corresponding author on reasonable request.

CONCENT FOR PUBLICATION

Not applicable.

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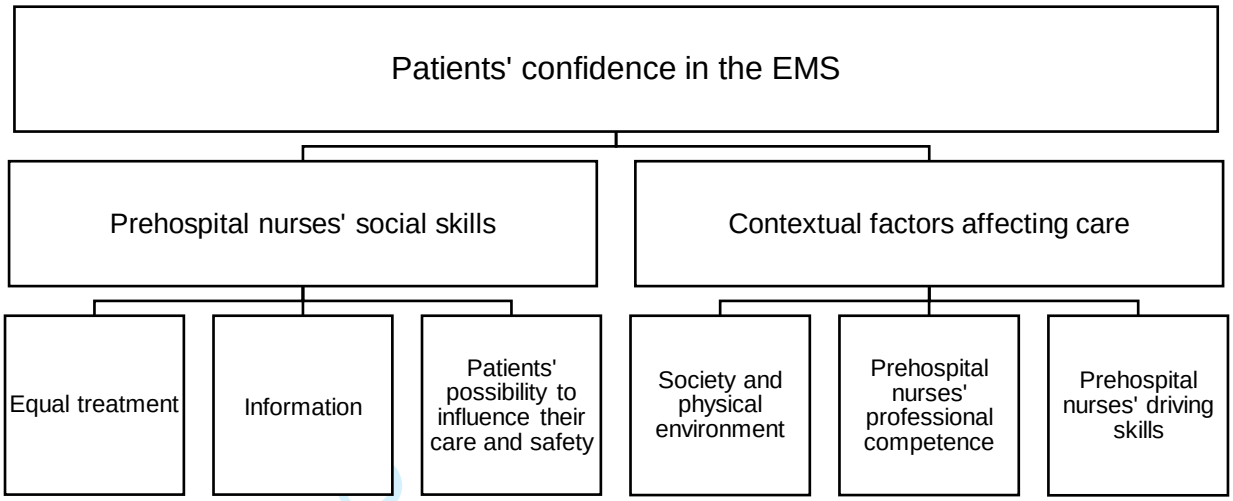

Figure 1. Patients' confidence in the EMS.

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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PATIENTS' SENSE OF THEIR SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

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PATIENTS' SENSE OF THEIR SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

ABSTRACT

Background: Research on patient safety in Emergency Medical Services (EMS) has mainly focused on the organization's and/or the EMS personnel's perspective. Little is known about how patients experience sense of safety in EMS. This study aims to describe the patients' experiences of their sense of safety in EMS.

Methods: A qualitative design with individual interviews of EMS patients (n=21) and an inductive qualitative content analysis were used.

Results: Patients' experiences of EMS personnel ability or inability to show or use their medical, technical, and driving skills affected the patients' sense of safety. When patients perceived a lack of professionalism and knowledge among EMS personnel, the patients felt unsafe. Patients highlighted equality in the encounter, the quality of the information given by EMS personnel, and the opportunity to participate in the care as important factors creating a sense of safety during the EMS encounter. Altogether, patients' experiences of sense of safety in EMS were connected to their confidence in the EMS personnel.

Conclusions: Overall, patients felt safe during their EMS encounter, but the EMS personnel professional competence alone is not enough for patients to feel safe. Lack of communication or professionalism may compromise patients' sense of safety. Further work is needed to explore how patients' experiences of sense of safety can be utilize in improving safety in EMS.

Keywords: Ambulance service; patient experience; qualitative study; safety; prehospital nurse

Strengths and limitations of this study

- The strengths are that detailed, rich information about patients' own experiences in their own words was gained.
- With this study, it was possible to gain knowledge about what patients consider important for feeling safe in the EMS.
- Interviews offered the opportunity to gain knowledge about safety in the EMS from the patients' perspective.
- A limitation is that the interviews were done in a small hospital district, which could limit the transferability of the results.

BACKGROUND

"To err is human"[1], but it can at worst cause disastrous results for patients seeking care and for the organization caring for the patients. Therefore, systematic development and research are needed to ensure and improve patient safety and quality of care. Errors are described as being usually caused by faulty systems, processes, or conditions in the organization rather than by individual health care workers, and thus, all health care actors, including patients, should be involved in developing the safety culture in health care. Global recommendations and guidelines to improve patient safety include the patients as active team members whenever possible[1-3]. Patients' experiences of difficulties and harms can provide information about safety, which is not obvious to healthcare staff[4].

The World Health Organization (WHO) has defined the term safety culture as *the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management.* Another WHO's definition for safety culture is *an integrated pattern of individual and organizational behavior, based upon shared beliefs and values, that continuously seeks to minimize patient harm which may result from the processes of care delivery.*[5] When researchers use the term "patient safety culture", they define sections of safety culture which have an impact to patient safety.[6-9] Considering this relationship between safety culture and patient safety culture, it is essential to recognize how this relationship affect the patients' experience of sense of safety. In this study, safety in emergency medical services (EMS) is explored from the patients' perspective. The EMS includes health care professionals who respond to emergency calls, assessing, treating and transporting patients to health care providers such as the emergency department (ED).

Safety and patient safety in emergency medical services

EMS in its nature can be considered a challenging and constantly changing environment compared with other emergency care settings such as hospitals. The hospital environment is especially built for patient care whereas the EMS personnel treat the patients in their homes, in public, inside the ambulance or outdoors. The not always predictable environment in EMS could compromise both EMS personnel and patients' safety. Transporting a patient to hospital by ambulance could also be a hazardous situation. The risks of traffic accidents are known to increase if driving with lights and sirens [10-11]. There is some evidence that safety culture and patient and EMS provider safety outcomes are interrelated. It is studied that EMS personnel who reported an error or adverse event (AE) evaluate safety culture lower than those who did not give affirmative response for an error or AE. Furthermore, EMS personnel who reported safety-compromising behavior evaluate safety culture lower than those who did not report safety-compromising behavior.[12]

Otherwise, patient safety studies within the EMS setting have mainly investigated AE, mishaps, near-misses, occupational hazards, and patient safety or quality of care, and these previous studies have mainly focused on the organization's or EMS's personnel perspective and have not included the patients' point of view on safety[13-17]. Patient safety from the patients' viewpoint has mainly been investigated in hospital settings, showing that patients give valuable insights into improving or assessing patient safety[18-20]. As the EMS personnel sometimes has to work in a challenging environment, including risks of driving hazards, there is a need to investigate the patients' experiences of sense of safety in the EMS. Therefore, the aim of this study was to describe the patients' experiences of their sense of safety in the EMS.

METHODS

A qualitative study design with individual interviews was used to explore patients' experiences of sense of their safety in the EMS.

Setting

This study was carried out in Finland, where the Hospital Districts are responsible for organizing the EMS. During the study period, there were 21 Hospital Districts and they can produce the EMS by themselves, or they can purchase the EMS from the other party, for example for the rescue departments, other hospital district or private companies. The EMS consists of advanced-level ambulances, usually responding to high priority tasks, staffed with personnel who has the knowledge to made advanced assessment of the patient, initiating treatment, symptom alleviation and if necessary, transport the patient to the next level of care. There are also basic-level ambulances, usually responding to low priority tasks, staffed with personnel who can assess the patients' vital signs, initiating basic cardio-pulmonary resuscitation. The advanced-level ambulances is staffed with two prehospital nurses or one prehospital nurse and another qualified person, e.g. nurse or other health care professional or rescue worker. The education level among advanced-level prehospital nurses is at least a registered nurse (3.5 years) with advanced life support education (one year alongside the work) or a prehospital nurse (4 years). Basic-level ambulances are manned by at least one emergency medical technician (EMT)[21,22]. In addition, every hospital district must have at least one EMS officer (operational supervisor of the shift, participates in challenging tasks) who is an advanced-level prehospital nurse with operative leadership education (for example Masters' degree or one-year operational leadership education) and leadership experience. The highest educated EMS personnel is always responsible for patient care, but when the patient is assessed as low priority, a nurse, EMT, or other health care professional can attend to the patient during transport.

This study was carried out in eastern Finland, a health care district covering approximately 132 000 inhabitants. There is one central hospital in the district and ambulance services covers an area 6872.10 km², including both rural and urban regions. Ambulance transports vary between 1 and over 100 km. In 2017, there were about 22 100 EMS requests in the area according to official statistics. At present (in 2018), there are one EMS officer, 11 ambulances, all of them are advanced level ambulances, and in addition there are two units with the assignments to treat and evaluate low priority patients at home. The units have the same equipment as the ambulance and point-of-care devices, but they are not capable of transporting the patient.

Data collection and participants

Data collection was undertaken at the central hospital ED, where patients are transported by EMS. Data were collected via semi-structured interviews during two-week period in March 2018. The interviews were conducted by the first author, a prehospital nurse with 20 years' working experience in the EMS, who has not had any professional or personal contact with the participants beforehand. Purposeful sampling [23] was used, aiming to achieve variation among participants without risking patient safety. The inclusion criteria were as follows: the patient was transported by the EMS to the ED after an emergency call to the emergency response centre (ERC). The patient was assessed as low priority in the ED or the patient was transported to the hospital as high priority, but the priority was assessed as low after treatment in the ED. The patients needing urgent treatment in the ED, patients under the influence of alcohol (based on ED nurses' assessment) or drugs and inter-hospital transports was excluded. Additional exclusion criteria were age being a minor, incapable of communicating in Finnish, or presence of dementia, confusion, or terminal disease. ED nurses identified eligible participants. The first author received a list of eligible participants from the ED nurse. The first author gave oral and written information

about the study and asked about participation after patients had received their initial assessment and treatment at the ED.

All interviews were performed during weekdays during daytime (between 8 am to 4 pm), although some of the interviewed patients had been transported to the ED in the night-time. The first, second, and last authors (the first and last authors with working experience in EMS as prehospital nurses, and the second author with experience as an EMS physician) together devised the interview questions. The interviews started with an open-ended question "*Can you tell me about your experience of the EMS encounter?"* To encourage patients to share their experiences, additional questions were asked concerning waiting time, assessment, treatment, transportation, and the handover at the ED. The interviews concluded by asking the patients to describe what made them feel safe or insecure during the EMS encounter. The interview guide is presented in supplementary file 1. Continuous discussions among the authors were done during the data collection. The interviews lasted between 10 and 20 minutes. The interviews continued until no new information was obtained during the interviews. The variations in the interviews started to be limited during interview 15, but six more interviews were conducted aiming to ensure that no new variations would emerge. All the interviews were recorded with a digital recorder and transcribed verbatim by the first author. All the transcriptions were anonymised. Two of the interviews were translated from Finnish into English to achieve transparency among all authors participating in the study.

Patient and public involvement

The patients or the public were not involved in the design and conduct of this study.

Data analysis

An inductive qualitative content analysis was used to analyse the data[24]. The analysis began after all interviews had been listened to and transcribed. The text was then read several times to obtain a sense of the whole and to identify the patients' expressions about their experiences of sense of safety in the EMS. The experiences were single words or short sentences. The third author, who had no experience in EMS, but had working knowledge of patient safety research, read the transcripts with the aim of increasing the reliability of the process and verifying the first phase of open coding. In the first phase of open coding, the expressions that were similar received the same open code. Coding was made without using any software for analysis. An example of the coding tree is presented in supplementary file 2.

After the open coding, the codes were collected into a coding sheet consisting of codes related to each other. These coding sheets were then abstracted into sub-categories, after which the sub-categories were grouped into generic categories and finally into the main category. During the analysis, there was a recurrent movement between the whole, the parts, and the whole. The authors were held multiple discussions to ensure the reliability and credibility of the analysis, keeping the balance between their pre-understanding and openness to the content during the analysis. In every phase, the analysis continued after consensus between the researchers was reached. The last phase in the analysis was the conceptualization of the results, displayed in Figure 1.

Ethical considerations

This study was approved by the Ethics Committee of Helsinki University Hospital (HUS/3529/2017). The patients received written information about the purpose of the study with contact information for the responsible researcher, and they had the possibility to ask

the first author questions about the research. The patients filled out a form affirming their voluntary participation in the study. The patients were informed that they have the right to withdraw from the study at any phase. During the interviews, the first author observed the patients and discontinued the discussion if any changes occurred in the patient's physical or mental condition.

RESULTS

In total, 22 patients were asked to participate, 21 of whom agreed to participate in the study. One male refused the interview without providing a reason. Some of the patients had used EMS more than once and for some of them, this was a first contact to the EMS. The main reason for seeking EMS care was cardiac-related symptoms or breathing difficulties, as displayed in Table 1. Two of the patients did not describe their health problem or the reason for requesting an ambulance.

Table 1. Description of patients.

	Female n=12	Male n=9
Age range (mean)	44–91 (74.5)	41–86 (68.1)
Transported from urban area	7	5
Transported from rural area	5	4
Primary condition as patients described		
Breathing difficulties	4	1
Cardiac-related symptoms	3	2

Gastrointestinal problems	2	1
Lower body pain	1	1
Minor injury	-	2
Neurological symptoms	-	2
Missing data	-	2

The main category *Patients' confidence in the EMS* shows that the patients feel safe in the EMS and have confidence in EMS personnel. The patients' confidence in the EMS personnel were divided in two generic categories: *EMS personnel's social skills* and *circumstantial factors affecting patients' care*. EMS personnel social skills consist of subcategories *equal treatment, information* and *involvement in care decisions.* Circumstantial factors affecting patients' care be composed of subcategories *environmental factors, EMS personnel professional competence* and *EMS personnel driving skills*. (Figure 1). The generic categories with their sub-categories are presented below with illustrative quotations.

EMS personnel social skills

The EMS personnel's social skills included from patient's perspective equality in the care, the possibility to get information, and opportunity to involve in their care affected patients' sense of safety in EMS. From the patients' point of view, equal treatment was not always the case among EMS personnel.

Equal treatment

According to the patients, equal treatment and a reliable patient-EMS personnel relationship generated a sense of safety in the EMS. The patients noted that it is essential that the EMS personnel's behaviour is calm, natural, and friendly. The patients expressed that a bit of

humour and small talk during the care lighten the atmosphere and help to create a good patient-EMS personnel relationship.

"They didn't feel like officials. They were like human to human." (Pt5)

On the other hand, patients described feelings of condescending and insecurity in care when the EMS personnel's behaviour created a sense of being rushed, when the personnel were negative or too official, or when the personnel lacked communication skills. The patients also stated that the EMS personnel did not always take their concerns seriously and sometimes ignored them altogether. This was reflected in how patients described situations where their mental and/or physical condition created a feeling of insecurity, e.g. if they had difficulties with breathing, felt lonely, or had to wait for the ambulance for a long time. Feeling insecure as a result of condescending treatment caused a sense of being unsafe among the patients.

"Waiting is the worst, especially if you are alone and there isn't anyone with you" (Pt6)

Information

Most patients mentioned that the EMS personnel gave enough information about the assessments, a student participant, environmental conditions, treatment, and medication as well as about driving with lights and sirens on. In addition, if the EMS personnel had contacted the hospital beforehand, the patients expressed that the information had transferred to the hospital personnel. The patients describe that in these situations their treatment in the hospital started smoothly and quickly. However, some patients described not getting enough information. Usually, the lack of information concerned what the EMS personnel has assessed and the assessments results or the patient's medication during care. Even these patients maintained confidence in the EMS personnel and their

professionalism because of the feeling that they received help from EMS personnel. Lack of information thus had negligible impact on patients' feelings of safety in the EMS.

> *"Ambulance personnel interviewed me and they took all sorts of assessments and I don't know all the assessments they took" (Pt13)*

Involvement in care decisions

According to the patients, their involvement in care decisions varied. The patients' possibility to affect their transport position had an impact on their sense of safety. Especially those patients suffering from breathing problems stated that they wanted to sit on the seat rather than lay on the stretcher even if they were placed in an upright position. However, EMS personnel usually ignored this wish without explaining why it was not possible. Although some of the patients said that they did not have the chance to affect how they were moved to the ambulance or what position or where to stay during the transport, however they did not automatically define this as a negative thing.

> *"They didn't let me walk anymore, they were pushing (with the stretchers) the old granny … it sort of gives a nice feeling that somebody is still taking care of the old granny" (Pt5)*

In some situations regarding safety, the patients took an active role. For example, they asked the EMS personnel to put safety belts on or they asked to reduce ambulance speed if they felt that the speed compromised their safety.

> *"I said that at least put the seatbelt on me. If you drive off the road, I fly out of here (from the stretchers) because I don't have the seatbelt on" (Pt10)*

Circumstantial factors affecting care

The patients feel that EMS provides an essential public safety function. They also described that the physical environment (e.g. road and weather conditions, ambulance suspension, and conditions inside the ambulance during the transport) affects their experience of sense of safety in the EMS. The EMS personnel's technical and driving skills were highlighted when the patients talked about their experiences of factors affecting the care and sense of safety in EMS.

Environmental factors

Environmental factors markedly affect patients' feelings of safety in EMS. The patients feel that EMS provides an essential public safety function. Almost all of the patients interviewed had some preconceived notions of how the EMS works, expectations based on their own experiences or on how the service has been described in the media. Quick response times increase patients' experience of sense of safety. However, the experience of quick response time varied between the patients. Patients described a feeling of relief and security when the EMS personnel arrived and brought help to them with good equipment. They mentioned that they felt safe while the ambulance transported them to hospital.

" Because I know that every time when I call an ambulance, help is near" (Pt13)

Some environmental issues reduced the patients' feeling of safety or made them uncomfortable. Bad, bumpy roads or poor suspension in the ambulance made patients feel worse during the transport. The experience of feeling bad increased if the temperature was too hot or too cold during the transport. Uncomfortable and narrow stretchers and difficulties in getting inside the ambulance impair the experience of the care.

"Why did the ambulance have such bad and noisy suspension? Was the road so bad or was it the ambulance suspension?" (Pt10)

EMS personnel's professional competence

Patients stated that EMS personnel professional competence made them feel safe during care. According to the patients, good professional competence means asking questions related to their health problems, background information about previous illness, medication, home situation, etc., and taking a lot of assessments and giving medication when needed. These factors made the patients feel that the treatment had started immediately and that the EMS personnel were interested in their health problem. Furthermore, the patients mentioned that when the EMS personnel supervised and gave guidance to the student it also had an effect on the patient's experience of the EMS personnel's professional competence. Patients noted that the EMS personnel mainly had good professional competence from their point of view.

> *"The guys inserted an IV* (intravenous cannula) *and did assessments. Very professional personnel inserted the IV into my forearm, so they are very well educated" (Pt11)*

> *"They took care of me and measured my blood pressure and gave me the medication orally and that made me feel safe" (Pt8)*

However, some of the patients perceived that the EMS personnel lacked professional competence, and this affected their sense of safety. This situation occurred when the EMS personnel were uncertain of what had caused the patients' health problem or when the patient became aware that the EMS personnel had a lack of knowledge, e.g. when the only solution to the patients' problem in the EMS personnel's view was to transport the patient to the hospital. In addition, when the EMS personnel were unable to put in an IV, the patients interpreted it as a lack of professional competence. These factors made the patient feel uncertain and unsafe.

"They said that they don't understand, and they brought me here (hospital)... they tried to insert an IV in my forearm and it failed" (Pt3)

EMS personnel driving skills

For the most part, the patients felt that the EMS personnel had good driving skills, reflected in "smooth and fast transportation" or not driving too fast. Furthermore, if the driver took notice of the weather and road conditions and adjusted the driving style to these, the patient had an impression of good driving skills and safe transportation. However, some of the patients felt unsafe and insecure if the ambulance speed was too high, especially if the weather conditions were bad or the roads were slippery or uneven.

"The hail was falling, it was the size of ping pong balls, and other cars had stopped at the roadside but the ambulance was going very fast" (Pt10)

DISCUSSION

Overall, the interviewed patients appeared to feel safe in the EMS and to have confidence in EMS personnel. Clearly, confidence in the care provider is the main factor affecting patients' sense of safety in the EMS. In addition, medical knowledge and driving skills are directly related to a positive sense of safety for the patient. However, the EMS personnel's professional competence and good driving skills are meaningless in maintaining the patients' confidence if the EMS personnel does not treat the patient in an equal and humane manner. Therefore, EMS personnel should become more aware of their social interactions with patients and the importance of these interactions to patients' perception of safety. In health care overall and in the EMS setting, it is crucial that health care workers support patient involvement in care decisions and provide relevant information to the patients. By the seeing the patient as a team member[19,25], the EMS personnel can create a psychologically safe environment for the patients. Patients then are more likely to talk about

their concerns, to get an experience of interaction, and to feel safe in the EMS encounter. In previous research among other factors, the Finnish patient safety experts stated that trust in the healthcare professionals and healthcare professionals' attitudes towards patient participation in general are important, when involve patients to improve patient safety[26].

In this study, the perception of equality, the possibility to get information, and the involvement in care decisions affected the patient's sense of safety in the EMS. A previous study[28] showed that shared information and being treated in a friendly and respectful manner are important when involving patients in patient safety. If the patient feels objectified by the EMS personnel, this may cause a feeling of "suffering from care"[28], leading to a sense of unsafety. Previous knowledge of patient experiences of safety in hospital settings[18-20] highlights that being treated equally is important to patients, and based on our findings this is also true in the context of EMS.

In our study, we did not classify the patients' negative experiences as AE, and conversely, having a sense of safety in the EMS is not the same as actually receiving safe care. Despite this, in other healthcare settings positive associations have been found between the patient experiences and patient safety and clinical effectiveness [29]. However, based on patients' experiences, valuable information emerged on how to improve patient safety and the patient encounter in EMS. Some of the patients had experienced, especially with driving, a situation that could have compromised the safety of the patient and the EMS personnel. The EMS personnel's clinical judgment was important when patients described what makes them feel safe when cared for by EMS personnel. Like a study conducted by Togher et al.[30], our study emphasizes the importance of a short waiting time, patients' confidence in the EMS personnel, and the personnel's professional skills and communication. Our study found that these factors also influence patients' experiences of sense of safety. However, in our study a short waiting time according to patients ranged from a few to 30 minutes.

In some respects, our findings are in line with the results described in former patient safety culture studies[6-9]. The generic category *Factors affecting patients' involvement in care decisions* reflects both the "social process" and the "psychological dimension[7] or teamwork, communication and patient-centred described in other studies[6,8-9]. On the other hand, generic category *Circumstantial factors affecting care* reflects the "organizational dimension"[7] or leadership and evidence-based described in the other studies[6,8-9]. However, our study also highlights the gap between what safety means to the EMS personnel or the EMS organization and how patients experience sense of safety in the EMS encounter. Like a study conducted in hospital setting suggests[31], error management should promote developing a strong safety culture that affords the patient a role in promoting safety in their care. However, EMS organizations and EMS personnel must continue to develop the other safety elements in the EMS.

Furthermore, based on this study and a former study[32], EMS personnel, EMS organizations, and vocational training providers need additional knowledge about factors affecting patients' sense of safety in the EMS. The EMS personnel require more education to improve their social skills and to be able to foster psychological safety for the patient. The curriculum in nurse training should thus be expanded to include development of social skills. Therefore, in the future it could be beneficial to explore the social factor between EMS personnel and the patients by using ethnographic framework within observational study.

Study strengths and limitations

It could be a strength or a limitation that the researchers had a deep pre-understanding of the research topic. Our deep theoretical and clinical experience helps us to understand patients' experiences of the EMS and also to put these into a clinical context despite the short interviews. However, theoretical and clinical experience could also cause a bias via a

lack of openness to the subject. To reduce this potential bias, we moved back and forward between the interviews and the expressions and between the categories and the interviews during the analysis. In addition, one of the researchers had no experience with EMS, but had working knowledge of patient safety, and this reduced the risk of bias caused by preconceptions.

The patients were recruited from only one health care district area, which could reduce the transferability of the results. However, patients' characteristics cover common EMS patient groups according to the ERC official statistics and therefore it is reasonable to think that the results can be transferred to similar context. According to the exclusion criteria, we did not interview high priority patients suffering for multiple traumas or other life-threatening conditions or inter-hospital transfers. These patients could have given valuable insight into how they experience sense of safety when EMS personnel must use for example support equipment and different kinds of transfer methods.

The interviews were performed when the patient was admitted to the ED. This may also be considered a limitation or a strength: a limitation due to the patient's experiences of illness, a strength due to their memory of the EMS personnel and the EMS encounter being fresh and unaffected by other people's opinions. Because of the timing of the interviews, one might assume that the care in the EMS was still in patients' recent memory. The short duration of the interviews may be a limitation and may have been caused by the patient's illness or fatigue.

Even if the interviews were done alone with the patient, it is possible that the patients were hesitant to openly share their views. There could have been barriers to the patients disclosing their concerns caused by for instance "I do not want to be a troublemaker", "I don't know how to raise my concern", or "I do not want to harm my relationship with members of the medical team"[33]. To reduce these concerns, the interviewer introduced herself as a

researcher, wore casual attire, and informed the patient that interviews are analysed anonymously. Moreover, we informed the patients that participating or withdrawing or anything that they say will not influence their treatment in the hospital or EMS. Despite certain limitations, this study offers valuable insights into patients' experience of sense of safety in EMS.

CONCLUSIONS

The EMS personnel's social interactions seem to be associated with patients' experience of sense of safety. Thus, more attention should be directed to the EMS personnel's social skills and their ability to create a psychologically safe environment for the patient. In addition, this study adds knowledge about the factors contributing to or reducing patients' perception of safety when attended to by EMS personnel. This information is valuable when EMS organizations design methods to involve patients in developing EMS organizations' safety performance.

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CONFLICT OF INTEREST

All authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed to this study as follows: study design (AV, VL, MC), data collection (AV), data analysis (AV, VL, ST), and writing the manuscript (AV, VL, MC, ST). All authors read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The data used and analysed during the study are available from the corresponding author on reasonable request.

CONCENT FOR PUBLICATION

Not applicable.

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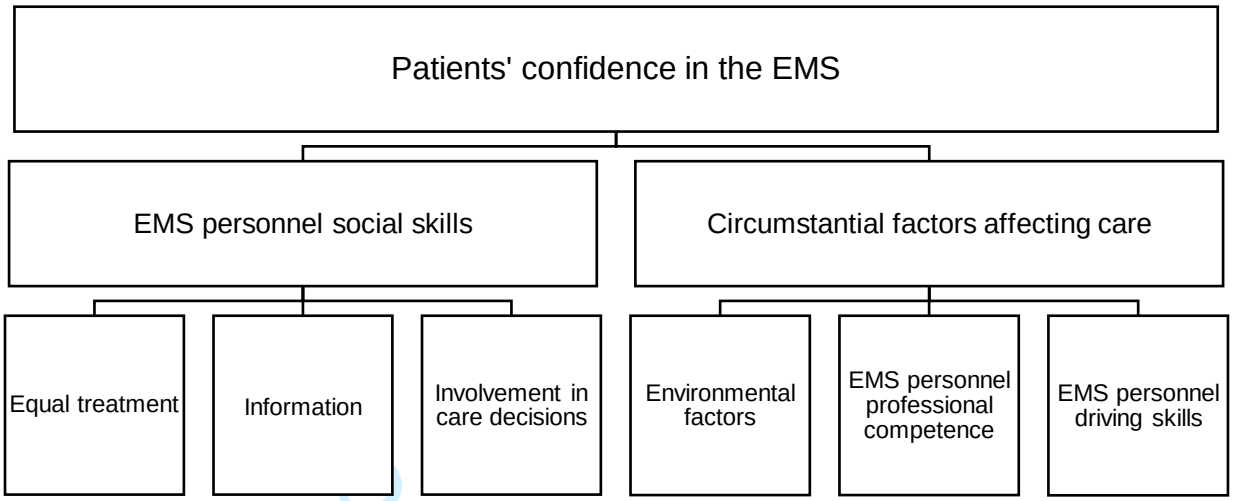

Figure 1. Patients' experiences of sense of their safety in the EMS.

Supplementary file 1: Interview guide

1. Can you tell me about your experience of the EMS encounter?
   - Additional questions:
     - Can you tell me more about the waiting time?
     - Can you tell me more about the assessment?
     - Can you tell me more about the treatment?
     - Can you tell me more about the transportation?
     - Can you tell me more about the handover at the ED?

2. What made you feel safe during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
3. Was there anything that made you feel insecure during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
4. Is there something else you want to tell me about the care in the EMS?

Supplementary file 2: Example of the coding tree

	Subcategories					
Patients' descriptions	Equal treatment	Information	Involvement in care decisions	Environmental factors	EMS personnel professional competence	EMS personnel driving skills
They weren't sort of formal. So, they were like a human next to a human. So, I feel that this is a very important thing at least for me personally. So, like if they look like officials/formal and just very formally ask these questions it is different than if they are not as formal. It creates a sort of pleasant feeling.	Don't feel nice if acting is too official Natural acting (not too official) makes relationship nice					
Well then, the ambulance staff interviewed me and they took all sorts of test and I don't know what they took but I think we were there for an hour and then they said that we should get to the hospital because it won't go away otherwise. So, then we came here and now I am here.		Lack of information about assessment and results				
And nothing else other than lie down inside the ambulance and cannula was inserted into my hand and I have type 1 diabetes so they took my blood sugar levels, there was nothing alarming in those readings and they asked if I want to have pain medications and I said I don't need any and every five minutes			Ask patient need for pain medication Ask patient feelings during the			

they asked if I was feeling ok. One of the paramedic's was chatting to me and taking down information and then we arrived at the hospital and we came into this treatment room and I could not imagine any better treatment or transportation or anything.			transport			
Well I did not hold on to anything, so I was just able to be sort of relaxed. But it did shake and bounce, so the road is worse there, but we got there regardless.				Shaky and bouncy ride Bad roads		
Well… They did investigations, like for example this morning. So, then they said that they don't understand so they will bring me here. Probably it was somewhat tricky what this illness may be, I don't know. Because it was only two weeks ago when I was here. The transportations were similar. And then when we left home they apparently stopped because I felt that it can't be this smooth on the road. They tried to insert, and it failed so it was not inserted (shows cannula). They can insert it soon at the hospital, apparently the veins are so fragile. That's why it failed. Yeah, I don't know what else to say.					Lack of knowledge (EMS personnel) Solution is to transport to the hospital Uncertainty to put an IV (paramedics try first and then decide to leave it to the hospital)	
It was good because I was tied securely so I did not sway, and the ambulance						Not driving too

driver did not drive recklessly and then I knew it was safe to be aboard on the way to get treatment. And to be in expert hands.						fast Sens of safety when get transported to hospital

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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PATIENTS' PERCEPTIONS OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

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Short running title: EMS patients' experiences of safety

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PATIENTS' PERCEPTIONS OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

ABSTRACT

Background: Research on patient safety in Emergency Medical Services (EMS) has mainly focused on the organization's and/or the EMS personnel's perspective. Little is known about how patients perceive safety in EMS. This study aims to describe the patients' experiences of their sense of safety in EMS.

Methods: A qualitative design with individual interviews of EMS patients (n=21) and an inductive qualitative content analysis were used.

Results: Patients' experiences of EMS personnel's ability or inability to show or use their medical, technical, and driving skills affected the patients' sense of safety. When they perceived a lack of professionalism and knowledge among EMS personnel, they felt unsafe. Patients highlighted equality in the encounter, the quality of the information given by EMS personnel, and the opportunity to participate in the care as important factors creating a sense of safety during the EMS encounter. Altogether, patients' perceptions of safety in EMS were connected to their confidence in the EMS personnel.

Conclusions: Overall, patients felt safe during their EMS encounter, but the EMS personnel's professional competence alone is not enough for them to feel safe. Lack of communication or professionalism may compromise their sense of safety. Further work is needed to explore how patients' perceptions of safety can be utilized in improving safety in EMS.

Keywords: Ambulance service; patient perception; qualitative study; safety; prehospital nurse

Strengths and limitations of this study

- The strengths are that detailed, rich information about patients' own experiences in their own words was gained.
- This study provides knowledge about what patients consider important for feeling safe in the EMS.
- Interviews offered the opportunity to gain knowledge about safety in the EMS from the patients' perspective.
- A limitation is that the interviews were done in a small hospital district, which could limit the transferability of the results.

BACKGROUND

"To err is human"[1], but it can at worst cause disastrous results for patients seeking care and for the organization caring for them. Therefore, systematic development and research are needed to ensure and improve patient safety and quality of care. Errors are described as being usually caused by faulty systems, processes, or conditions in the organization rather than by individual health care workers, and thus, all health care actors, including patients, should be involved in developing the safety culture in health care. Global recommendations and guidelines to improve patient safety include the patients as active team members whenever possible[1-3]. Patients' experiences of difficulties and harms can provide information about safety, which is not obvious to healthcare staff[4].

The World Health Organization (WHO) has defined the term safety culture as *the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management.* According to WHO, another definition for safety culture is *an integrated pattern of individual and organizational behavior, based upon shared beliefs and values, that continuously seeks to minimize patient harm which may result from the processes of care delivery.*[5] When researchers use the term "patient safety culture", they define sections of safety culture which have an impact on patient safety.[6-9] Considering this relationship between safety culture and patient safety culture, it is essential to recognize how relationship affects the patients' perceptions of safety. In this study, safety in emergency medical services (EMS) is explored from the patients' perspective. The EMS includes health care professionals who respond to emergency calls, assessing, treating, and transporting patients to health care providers such as the emergency department (ED).

Safety and patient safety in emergency medical services

By nature, EMS can be considered a challenging and constantly changing environment compared with other emergency care settings such as hospitals. The hospital environment is especially built for patient care whereas the EMS personnel treat the patients in their homes, in public, inside the

ambulance or outdoors. Because the environment is not always predictable in EMS, it could compromise the safety of both EMS personnel and patients. Transporting a patient to hospital by ambulance could also be a hazardous situation. The risks of traffic accidents are known to increase if driving with lights and sirens [10-11]. There is some evidence that safety culture and patient and EMS provider safety outcomes are interrelated. EMS personnel who reported an error or adverse event (AE) evaluate safety culture lower than those who did not report an error or AE. Furthermore, EMS personnel who reported safety-compromising behavior evaluate safety culture lower than those who did not.[12]

Otherwise, patient safety studies within the EMS setting have mainly investigated AE, mishaps, near-misses, occupational hazards, and patient safety or quality of care, and these previous studies have mainly focused on the organization's or EMS personnel's perspective and ignored the patients' point of view on safety[13-17]. Patient safety from the their own viewpoint has mainly been investigated in hospital settings, showing that they give valuable insights into improving or assessing patient safety[18-20]. As the EMS personnel sometimes has to work in a challenging environment, including risks of driving hazards, there is a need to investigate the patients' perceptions of safety in the EMS. Therefore, the aim of this study was to describe the patients' perceptions of safety in the EMS.

METHODS

A qualitative study design with individual interviews was used to explore patients' perceptions of safety in the EMS.

Setting

This study was carried out in Finland, where the Hospital Districts are responsible for organizing the EMS. The Finnish EMS consists of advanced-level ambulances and basic-level ambulances, and every hospital district must have at least one EMS officer (operational supervisor of the shift, participates in challenging tasks). The advanced-level ambulances are staffed with two prehospital

nurses or one prehospital nurse and another qualified person, e.g. nurse or other health care professional or rescue worker. The education level among advanced-level prehospital nurses is at least a registered nurse (3.5 years) with advanced life support education (one year alongside the work) or a prehospital nurse (4 years). Basic-level ambulances are manned by at least one emergency medical technician (EMT)[21,22]. The EMS officer should be an advanced-level prehospital nurse with operative leadership education (for example Masters' degree or one-year operational leadership education) and leadership experience. The highest educated EMS personnel is always responsible for patient care, but when the patient is assessed as low priority, a nurse, EMT, or other health care professional can attend to the them during transport.

The health care district this study was conducted in is eastern Finland and it covers approximately 132 000 inhabitants. There is one central hospital in the district and ambulance services cover an area 6872.10km², including both rural and urban regions. Ambulance transports vary between 1 and over 100km. In 2017, there were about 22 100 EMS requests in the area according to official statistics. At present (in 2018), there are one EMS officer, 11 ambulances, all of them advanced level ambulances, and in addition there are two units with the assignments to treat and evaluate low priority patients at home. The units have the same equipment as the ambulance and point-of-care devices, but they are not capable of transporting the patient.

Data collection and participants

Data collection was undertaken at the central hospital ED, where patients are transported by EMS. Data were collected via semi-structured interviews during a two-week period in March 2018. The interviews were conducted by the first author, a prehospital nurse with 20 years' working experience in the EMS, who has not had any professional or personal contact with the participants beforehand. Purposeful sampling [23] was used, aiming to achieve variation (gender, age, urban/rural area, primary condition) among participants without risking patient safety. The inclusion criteria were as follows: the patient was transported by the EMS to the ED after an

emergency call to the emergency response centre (ERC). The patient was assessed as low priority in the ED or the patient was transported to the hospital as high priority, but the priority was assessed as low after treatment in the ED. The patients needing urgent treatment in the ED, patients under the influence of alcohol (based on ED nurses' assessment) or drugs and inter-hospital transports were excluded. Additional exclusion criteria were being younger than 18 years of age, incapability of communicating in Finnish, or presence of dementia, confusion, or terminal disease. ED nurses identified eligible participants. The first author received a list of eligible participants from the ED nurse, gave oral and written information about the study and asked about participation after patients had received their initial assessment and treatment at the ED.

All interviews were performed on weekdays between 8 am to 4 pm, although some of the interviewed patients had been transported to the ED in the night-time. The first, second, and last authors (the first and last authors with working experience in EMS as prehospital nurses, and the second author with experience as an EMS physician) together devised the interview questions. The interviews started with an open-ended question: "*Can you tell me about your experience of the EMS encounter?"* To encourage patients to share their experiences, additional questions were asked concerning waiting time, assessment, treatment, transportation, and the handover at the ED. The interviews were concluded by asking the patients to describe what made them feel safe or insecure during the EMS encounter. The interview guide is presented in supplementary file 1. The authors held multiple discussions during the data collection. The interviews lasted between 10 and 20 minutes. The interviews continued until no new information was obtained during the interviews. The variations in the interviews started to be limited during interview 15, but six more interviews were conducted aiming to ensure that no new variations would emerge. All the interviews were recorded with a digital recorder and transcribed verbatim by the first author. All the transcriptions were anonymised. Two of the interviews were translated from Finnish into English to achieve transparency among all authors participating in the study.

Patient and public involvement

The patients or the public were not involved in the design and conduct of this study.

Data analysis

An inductive qualitative content analysis was used to analyse the data[24]. The analysis began after all interviews had been listened to and transcribed. The text was then read several times to obtain a sense of the whole and to identify the patients' expressions about their perceptions of safety in the EMS. The expressions were single words or short sentences. The third author, who had no experience in EMS, but had working knowledge of patient safety research, read the transcripts with the aim of increasing the reliability of the process and verifying the first phase of open coding, in which similar expressions received the same open code. The coding was made without using any software for analysis. An example of the coding tree is presented in supplementary file 2.

After the open coding, the codes were collected into a sheet with other related codes. These coding sheets were then abstracted into sub-categories, which were grouped into generic categories and finally into the main category. During the analysis, there was a recurrent movement between the whole and the parts. The authors held multiple discussions to ensure the reliability and credibility of the analysis, keeping the balance between their pre-understanding and openness to the content during the analysis. In every phase, the analysis continued until consensus between the researchers was reached. The last phase in the analysis was the conceptualization of the results, displayed in Figure 1.

Ethical considerations

This study was approved by the Ethics Committee of Helsinki University Hospital (HUS/3529/2017). The patients received written information about the purpose of the study with contact information for the responsible researcher, and they had the possibility to ask the first author questions about the research. The patients filled out a form affirming their voluntary participation in the study. The

patients were informed that they have the right to withdraw from the study at any phase. During the interviews, the first author observed the patients and discontinued the discussion if any changes occurred in the patient's physical or mental condition.

RESULTS

In total, 22 patients were asked to participate, 21 of whom agreed to participate in the study. One male refused the interview without providing a reason. Some of the patients had used EMS more than once and for some of them, this was a first contact to the EMS. The main reason for seeking EMS care was cardiac-related symptoms or breathing difficulties, as displayed in Table 1. Two of the patients did not describe their health problem or the reason for requesting an ambulance.

Table 1. Description of patients.

	Female n=12	Male n=9
Age range (mean)	44–91 (74.5)	41–86 (68.1)
Transported from urban area	7	5
Transported from rural area	5	4
Primary condition as patients described		
Breathing difficulties	4	1
Cardiac-related symptoms	3	2
Gastrointestinal problems	2	1
Lower body pain	1	1
Minor injury	-	2
Neurological symptoms	-	2
Missing data	2	-

The main category *Patients' confidence in the EMS* shows that the patients feel safe in the EMS and have confidence in EMS personnel. The patients' confidence in the EMS personnel were divided in two generic categories: *EMS personnel's social skills* and *circumstantial factors affecting patients' care*. EMS personnel's social skills and professional competence consist of subcategories *equal*

treatment, information, involvement in care decisions and *EMS personnel's professional competence.* Circumstantial factors affecting patients' care is composed of subcategories *environmental factors* and *EMS personnel's driving skills*. (Figure 1). The generic categories with their sub-categories are presented below with illustrative quotations.

EMS personnel social's skills and professional competence

The EMS personnel's social skills and professional competence that affected patients' sense of safety in EMS included being treated equally, receiving information, being involved in their care, and getting professional treatment.

Equal treatment

According to the patients, equal treatment and a reliable patient-EMS personnel relationship generated a sense of safety in the EMS. The patients noted that it is essential that the EMS personnel's behaviour is calm, natural, and friendly. They expressed that a bit of humour and small talk during the care lighten the atmosphere and help to create a good patient-EMS personnel relationship.

"They didn't feel like officials. They were like human to human." (Pt5)

On the other hand, patients said that they felt insecure or that the EMS personnel acted in a condescending way when the personnel's behaviour was rushed, negative or too official, or when the personnel lacked communication skills. The patients also stated that the EMS personnel did not always take their concerns seriously and sometimes ignored them altogether. This was reflected in how patients described situations where their mental and/or physical condition created a feeling of insecurity, e.g. if they had difficulties with breathing, felt lonely, or had to wait for the ambulance for a long time. Feeling insecure because of condescending treatment caused a sense of being unsafe among the patients.

"*Waiting is the worst, especially if you are alone and there isn't anyone with you." (Pt6)*

Information

Most patients mentioned that the EMS personnel handed over enough information about the assessments, a student presence, environmental conditions, treatment, and medication as well as about driving with lights and sirens on. In addition, if the EMS personnel had contacted the hospital beforehand, the patients expressed that the information had transferred to the hospital personnel. The patients described that in these situations their treatment in the hospital started smoothly and quickly. However, some patients mentioned not getting enough information. Usually, the lack of information concerned what the EMS personnel has assessed, the assessments results or the patient's medication during care. Even these patients maintained confidence in the EMS personnel and their professionalism because of the feeling that they received help from EMS personnel. Lack of information thus had negligible impact on patients' feelings of safety in the EMS.

"Ambulance personnel interviewed me and they took all sorts of assessments and I don't know all the assessments they took." (Pt13)

Involvement in care decisions

According to the patients, their involvement in care decisions varied. The patients' possibility to affect their transport position had an impact on their sense of safety. Especially the ones suffering from breathing problems stated that they wanted to sit on the seat rather than lay on the stretcher even if they were placed in an upright position. However, EMS personnel usually ignored this wish without explaining why it was not possible. Although some of the patients said that they did not have the chance to influence how they were moved to the ambulance or what position or where to stay during the transport, they did not automatically consider it negative.

"They didn't let me walk anymore, they were pushing (with the stretchers) the old granny … it sort of gives a nice feeling that somebody is still taking care of the old granny." (Pt5)

In some situations regarding safety, the patients took an active role. For example, they asked the EMS personnel to put safety belts on or they asked to reduce ambulance speed if they felt that the speed compromised their safety.

> *"I said that at least put the seatbelt on me. If you drive off the road, I fly out of here (from the stretchers) because I don't have the seatbelt on." (Pt10)*

EMS personnel's professional competence

Patients stated that EMS personnel's professional competence made them feel safe during care. According to them, good professional competence means asking questions related to their health problems, background information about previous illnesses, medication, home situation, etc., and taking assessments and giving medication when needed. These factors made them feel that the treatment had started immediately and that the EMS personnel were interested in their health problem. Furthermore, the patients mentioned that when the EMS personnel supervised and gave guidance to the student it also had an effect on the patient's perception of the EMS personnel's professional competence. They noted that the EMS personnel mainly had good professional competence from their point of view.

> *"The guys inserted an IV* (intravenous cannula) *and did assessments. Very professional personnel inserted the IV into my forearm, so they are very well educated." (Pt11)*
>
> *"They took care of me and measured my blood pressure and gave me the medication orally and that made me feel safe." (Pt8)*

However, some of the patients perceived that the EMS personnel lacked professional competence, and this affected their sense of safety. This situation occurred when the EMS personnel were uncertain of what had caused the patients' health problem or when the patient became aware that the EMS personnel had a lack of knowledge, e.g. when the only solution to the problem in the EMS personnel's view was to transport the patient to the hospital. In addition, when the personnel were unable to put

in an IV, the patients interpreted it as a lack of professional competence. These factors made the patient feel uncertain and unsafe.

"They said that they don't understand, and they brought me here (hospital)... they tried to insert an IV in my forearm and it failed." (Pt3)

Circumstantial factors affecting care

Environmental factors (e.g. road and weather conditions, ambulance suspension, and conditions inside the ambulance during the transport) and driving skills create the circumstances where the EMS patients get treatment. These circumstantial factors were highlighted when the patients talked about their perceptions of factors affecting the care and sense of safety in EMS.

Environmental factors

Environmental factors markedly affect patients' feelings of safety in EMS. They feel that EMS provides an essential public safety function. Almost all of the patients interviewed had some preconceived notions of how the EMS works, expectations based on their own perceptions or on how the service has been described in the media. Quick response times increase their perceptions of safety. However, the experience of a quick response time varied between the patients. They mentioned that they felt safe while the ambulance transported them to hospital. They also described a feeling of relief and security when the EMS personnel arrived and brought help to them with good equipment.

" Because I know that every time when I call an ambulance, help is near." (Pt13)

Some environmental issues reduced the patients' feeling of safety or made them uncomfortable. Uncomfortable and narrow stretchers and difficulties in getting inside the ambulance impair the experience of the care. The experience of feeling bad increased if the temperature was too hot or too cold during the transport. Bad, bumpy roads or poor suspension in the ambulance also made patients feel worse.

"Why did the ambulance have such bad and noisy suspension? Was the road so bad or was it the ambulance suspension?" (Pt10)

EMS personnel's driving skills

For the most part, the patients felt that the EMS personnel had good driving skills, reflected in "smooth and fast transportation" or not driving too fast. Furthermore, if the driver took notice of the weather and road conditions and adjusted the driving style accordingly, the patient had an impression of good driving skills and safe transportation. However, some of the patients felt unsafe and insecure if the ambulance's speed was too high, especially if the weather conditions were bad or the roads were slippery or uneven.

"It was hailing, they were the size of ping pong balls, and other cars had stopped at the roadside but the ambulance was going very fast." (Pt10)

DISCUSSION

Overall, the interviewed patients appeared to feel safe in the EMS and to have confidence in EMS personnel. Clearly, confidence in the care provider is the main factor affecting patients' sense of safety in the EMS. In addition, medical knowledge and driving skills are directly related to a positive sense of safety. However, the EMS personnel's professional competence and good driving skills are meaningless in maintaining the patients' confidence if the EMS personnel does not treat them in an equal and humane manner. Therefore, EMS personnel should become more aware of their social interactions and their importance to patients' perception of safety. In health care overall and in the EMS setting, it is crucial that health care workers support patient involvement in care decisions and provide relevant information to the patients. By seeing the patient as a team member and involving them in their care[19,25], the EMS personnel can create a psychologically safe environment for the patients. Patients then are more likely to talk about their concerns, to get an experience of interaction, and to feel safe in the EMS encounter. In previous research, the Finnish

patient safety experts stated that trust in the healthcare professionals and their attitudes towards patient participation in general are important, when involving patients in improving patient safety[26].

In this study, the perception of equality, the possibility to get information, and the involvement in care decisions affected the patient's sense of safety in the EMS. A previous study[27] showed that shared information and being treated in a friendly and respectful manner are important according to patients. If they feel objectified by the EMS personnel, this may cause a feeling of "suffering from care"[28], leading to a sense of unsafety. Previous knowledge of patient experiences of safety in hospital settings[18-20] highlights that being treated equally is important to patients, and based on our findings this is also true in the context of EMS.

In other healthcare settings, researchers establish positive associations between the patient experiences and patient safety and clinical effectiveness[29]. From the experiences, valuable information emerged on how to improve patient safety and the patient encounter in EMS. The EMS personnel's clinical judgment was important when patients described what makes them feel safe when cared for by EMS personnel. On the other hand, some of the patients had experienced, especially with driving, a situation that could have compromised the safety of the patient and the EMS personnel. A previous study reveals that EMS users value a short waiting time, confidence, professionalism and communication[30]. Our study points out that these same factors also influence their perceptions of their safety. However, in our study a short waiting time according to patients ranged from a few to 30 minutes.

In some respects, our findings are in line with the results described in former patient safety culture studies[6-9]. The categories *equal treatment, information* and *involvement in care decisions* reflect both the "social process" and the "psychological dimension"[7] or teamwork, communication and patient-centredness described in other studies[6,8-9]. On the other hand, the categories *EMS personnel's professional competence, environmental factors* and *EMS personnel's driving skills*

reflect the "organizational dimension"[7] or leadership and evidence-based health care described in the other studies[6,8-9]. Like a study conducted in hospital setting suggests[31], error management should promote developing a strong safety culture that affords the patient a role in promoting safety in their care. Our study highlights the gap between what safety means to the EMS personnel or the EMS organization and what kind of perceptions patients had safety in the EMS encounter. Patient perception of safety in the EMS is not the same as actually receiving safe care. Therefore, EMS organizations and EMS personnel must continue to develop the other safety elements in the EMS. Furthermore, based on this study and a former study[32], EMS personnel, EMS organizations, and vocational training providers need additional knowledge about factors affecting patients' sense of safety in the EMS. The EMS personnel require more education to improve their social skills and to be able to foster psychological safety for the patient. The curriculum in EMS personnel training should thus be expanded to include development of social skills. Therefore, in the future it could be beneficial to explore the social factor between EMS personnel and the patients by using ethnographic framework within observational study.

Study strengths and limitations

It could be a strength or a limitation that the researchers had a deep pre-understanding of the research topic. Our deep theoretical and clinical experience helps us to understand patients' experiences of the EMS and also to put these into a clinical context despite the short interviews. However, theoretical and clinical experience could also cause a bias via a lack of openness to the subject. To reduce this potential bias, we moved back and forth between the interviews and the expressions and between the categories and the interviews during the analysis. In addition, one of the researchers had no experience with EMS, but had working knowledge of patient safety, and this reduced the risk of bias caused by preconceptions.

The patients were recruited from only one health care district area, which could reduce the transferability of the results. However, patients' characteristics cover common EMS patient groups

according to the ERC official statistics and therefore it is reasonable to think that the results can be transferred to a similar context. According to the exclusion criteria, we did not interview high priority patients suffering for multiple traumas or other life-threatening conditions or inter-hospital transfers. These patients could have given valuable information their perceptions of safety when EMS personnel must use for example support equipment and different kinds of transfer methods.

The interviews were performed when the patient was admitted to the ED. This may also be considered a limitation or a strength: a limitation due to the patient's experiences of illness, a strength due to their memory of the EMS personnel and the EMS encounter being fresh and unaffected by other people's opinions. Because of the timing of the interviews, one might assume that the care in the EMS was still in the patients' recent memory. The short duration of the interviews may be a limitation and may have been caused by the patients' illness or fatigue. It is possible that the short duration would limit the depth of understanding.

Even though the interviews were done alone with the patient, it is possible that the patients were hesitant to openly share their views. There could have been barriers to the patients disclosing their concerns caused by for instance "I do not want to be a troublemaker", "I do not know how to raise my concern", or "I do not want to harm my relationship with members of the medical team"[33]. To reduce these concerns, the interviewer introduced herself as a researcher, wore casual attire, and informed the patient that interviews are analysed anonymously. Moreover, we informed the patients that participating or withdrawing or anything that they say will not influence their treatment in the hospital or EMS. Despite certain limitations, this study offers valuable insights into patients' perceptions of safety in EMS.

CONCLUSIONS

The EMS personnel's social interactions seem to be associated with patients' perceptions of safety. Thus, more attention should be directed to their social skills and their ability to create a

psychologically safe environment for the patient. In addition, this study adds to the knowledge about the factors contributing to or reducing patients' perception of safety when attended to by EMS personnel. This information is valuable when EMS organizations design methods to involve patients in developing their safety performance.

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CONFLICT OF INTEREST

All authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed to this study as follows: study design (AV, VL, MC), data collection (AV), data analysis (AV, VL, ST), and writing the manuscript (AV, VL, MC, ST). All authors read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The data used and analysed during the study are available from the corresponding author on reasonable request.

CONCENT FOR PUBLICATION

Not applicable.

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Figure legend: Overview of the categories

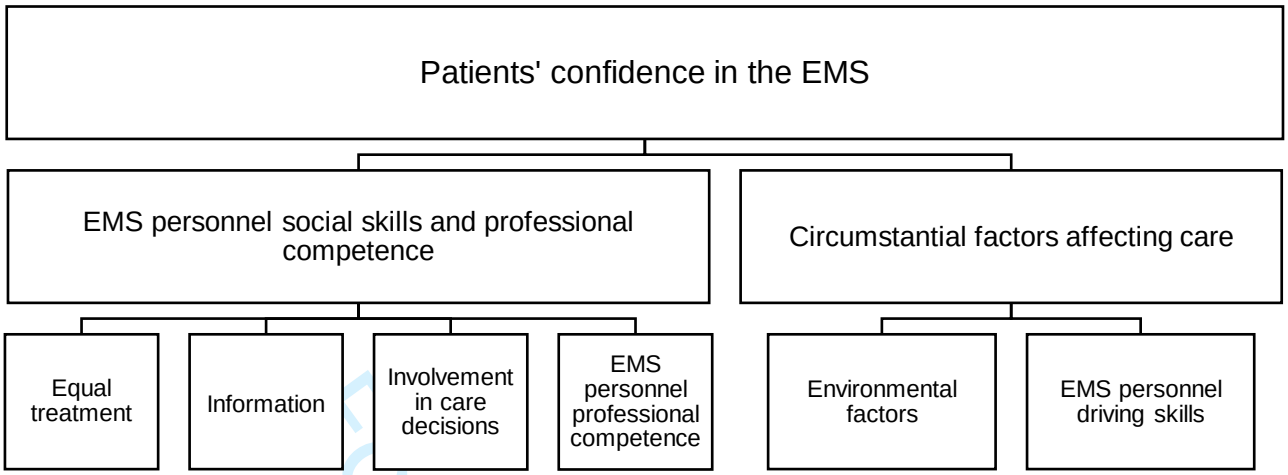

Figure 1. Overview of the categories.

Supplementary file 1: Interview guide

1. Can you tell me about your experience of the EMS encounter?
   - Additional questions:
     - Can you tell me more about the waiting time?
     - Can you tell me more about the assessment?
     - Can you tell me more about the treatment?
     - Can you tell me more about the transportation?
     - Can you tell me more about the handover at the ED?

2. What made you feel safe during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
3. Was there anything that made you feel insecure during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
4. Is there something else you want to tell me about the care in the EMS?

Supplementary file 2: Example of the coding tree

	Subcategories					
Patients' descriptions	Equal treatment	Information	Involvement in care decisions	Environmental factors	EMS personnel professional competence	EMS personnel driving skills
They weren't sort of formal. So, they were like a human next to a human. So, I feel that this is a very important thing at least for me personally. So, like if they look like officials/formal and just very formally ask these questions it is different than if they are not as formal. It creates a sort of pleasant feeling.	Don't feel nice if acting is too official Natural acting (not too official) makes relationship nice					
Well then, the ambulance staff interviewed me and they took all sorts of test and I don't know what they took but I think we were there for an hour and then they said that we should get to the hospital because it won't go away otherwise. So, then we came here and now I am here.		Lack of information about assessment and results				
And nothing else other than lie down inside the ambulance and cannula was inserted into my hand and I have type 1 diabetes so they took my blood sugar levels, there was nothing alarming in those readings and they asked if I want to have pain medications and I said I don't need any and every five minutes			Ask patient need for pain medication Ask patient feelings during the			

they asked if I was feeling ok. One of the paramedic's was chatting to me and taking down information and then we arrived at the hospital and we came into this treatment room and I could not imagine any better treatment or transportation or anything.			transport			
Well I did not hold on to anything, so I was just able to be sort of relaxed. But it did shake and bounce, so the road is worse there, but we got there regardless.				Shaky and bouncy ride Bad roads		
Well… They did investigations, like for example this morning. So, then they said that they don't understand so they will bring me here. Probably it was somewhat tricky what this illness may be, I don't know. Because it was only two weeks ago when I was here. The transportations were similar. And then when we left home they apparently stopped because I felt that it can't be this smooth on the road. They tried to insert, and it failed so it was not inserted (shows cannula). They can insert it soon at the hospital, apparently the veins are so fragile. That's why it failed. Yeah, I don't know what else to say.					Lack of knowledge (EMS personnel) Solution is to transport to the hospital Uncertainty to put an IV (paramedics try first and then decide to leave it to the hospital)	
It was good because I was tied securely so I did not sway, and the ambulance						Not driving too

driver did not drive recklessly and then I knew it was safe to be aboard on the way to get treatment. And to be in expert hands.						fast Sens of safety when get transported to hospital

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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PATIENTS' PERCEPTIONS OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

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PATIENTS' PERCEPTIONS OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

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Short running title: EMS patients' experiences of safety

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PATIENTS' PERCEPTIONS OF SAFETY IN EMERGENCY MEDICAL SERVICES – AN INTERVIEW STUDY

ABSTRACT

Background: Research on patient safety in Emergency Medical Services (EMS) has mainly focused on the organization's and/or the EMS personnel's perspective. Little is known about how patients perceive safety in EMS. This study aims to describe the patients' experiences of their sense of safety in EMS.

Methods: A qualitative design with individual interviews of EMS patients (n=21) and an inductive qualitative content analysis were used.

Results: Patients' experiences of EMS personnel's ability or inability to show or use their medical, technical, and driving skills affected the patients' sense of safety. When they perceived a lack of professionalism and knowledge among EMS personnel, they felt unsafe. Patients highlighted equality in the encounter, the quality of the information given by EMS personnel, and the opportunity to participate in their care as important factors creating a sense of safety during the EMS encounter. Altogether, patients' perceptions of safety in EMS were connected to their confidence in the EMS personnel.

Conclusions: Overall, patients felt safe during their EMS encounter, but the EMS personnel's professional competence alone is not enough for them to feel safe. Lack of communication or professionalism may compromise their sense of safety. Further work is needed to explore how patients' perceptions of safety can be utilized in improving safety in EMS.

Keywords: Ambulance service; patient perception; qualitative study; safety; prehospital nurse

Strengths and limitations of this study

- This study provides knowledge about what patients consider important for feeling safe in the EMS.
- Detailed, rich information was captured and analysed of individual patient perceptions of their safety during their interactions with EMS.
- A limitation is that the interviews were done in a small hospital district, which could limit the transferability of the results.

BACKGROUND

"To err is human"[1], but it can at worst cause disastrous results for patients seeking care and for the organization caring for them. Therefore, systematic development and research are needed to ensure and improve patient safety and quality of care. Errors are described as being usually caused by faulty systems, processes, or conditions in the organization rather than by individual health care workers, and thus, all health care actors, including patients, should be involved in developing the safety culture in health care. Global recommendations and guidelines to improve patient safety include the patients as active team members whenever possible[1-3]. Patients' experiences of difficulties and harms can provide information about safety, which is not obvious to healthcare staff[4].

The World Health Organization (WHO) has defined the term safety culture as *the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management.* According to WHO, another definition for safety culture is *an integrated pattern of individual and organizational behavior, based upon shared beliefs and values, that continuously seeks to minimize patient harm which may result from the processes of care delivery.*[5] When researchers use the term "patient safety culture", they define sections of safety culture which have an impact on patient safety.[6-9] Considering this relationship between safety culture and patient safety culture, it is essential to recognize how relationship affects the patients' perceptions of safety. In this study, safety in emergency medical services (EMS) is explored from the patients' perspective. The EMS includes health care professionals who respond to emergency calls, assessing, treating, and transporting patients to health care providers such as the emergency department (ED).

Safety and patient safety in emergency medical services

By nature, EMS can be considered a challenging and constantly changing environment compared with other emergency care settings such as hospitals. The hospital environment is especially built for patient care whereas the EMS personnel treat the patients in their homes, in public, inside the ambulance or outdoors. Because the environment is not always predictable in EMS, it could compromise the safety of both EMS personnel and patients. Transporting a patient to hospital by ambulance could also be a hazardous situation. The risks of traffic accidents are known to increase if driving with lights and sirens [10-11]. There is some evidence that safety culture and patient and EMS provider safety outcomes are interrelated. EMS personnel who reported an error or adverse event (AE) evaluate safety culture lower than those who did not report an error or AE. Furthermore, EMS personnel who reported safety-compromising behavior evaluate safety culture lower than those who did not.[12]

Otherwise, patient safety studies within the EMS setting have mainly investigated AE, mishaps, near-misses, occupational hazards, and patient safety or quality of care, and these previous studies have mainly focused on the organization's or EMS personnel's perspective and ignored the patients' point of view on safety[13-17]. Patient safety from the their own viewpoint has mainly been investigated in hospital settings, showing that they give valuable insights into improving or assessing patient safety[18-20]. As the EMS personnel sometimes has to work in a challenging environment, including risks of driving hazards, there is a need to investigate the patients' perceptions of safety in the EMS. Therefore, the aim of this study was to describe the patients' perceptions of safety in the EMS.

METHODS

A qualitative study design with individual interviews was used to explore patients' perceptions of safety in the EMS.

Setting

This study was carried out in Finland, where the Hospital Districts are responsible for organizing the EMS. The Finnish EMS consists of advanced-level ambulances and basic-level ambulances, and every hospital district must have at least one EMS officer (operational supervisor of the shift, participates in challenging tasks). The advanced-level ambulances are staffed with two prehospital nurses or one prehospital nurse and another qualified person, e.g. nurse or other health care professional or rescue worker. The education level among advanced-level prehospital nurses is at least a registered nurse (3.5 years) with advanced life support education (one year alongside the work) or a prehospital nurse (4 years). Basic-level ambulances are manned by at least one emergency medical technician (EMT)[21,22]. The EMS officer should be an advanced-level prehospital nurse with operative leadership education (for example Masters' degree or one-year operational leadership education) and leadership experience. The highest educated EMS personnel is always responsible for patient care, but when the patient is assessed as low priority, a nurse, EMT, or other health care professional can attend to the them during transport.

The health care district this study was conducted in is eastern Finland and it covers approximately 132 000 inhabitants. There is one central hospital in the district and ambulance services cover an area 6872.10km², including both rural and urban regions. Ambulance transports vary between 1 and over 100km. In 2017, there were about 22 100 EMS requests in the area according to official statistics. At present (in 2018), there are one EMS officer, 11 ambulances, all of them advanced level ambulances, and in addition there are two units with the assignments to treat and evaluate low priority patients at home. The

units have the same equipment as the ambulance and point-of-care devices, but they are not capable of transporting the patient.

Data collection and participants

Data collection was undertaken at the central hospital ED, where patients are transported by EMS. Data were collected via semi-structured interviews during a two-week period in March 2018. The interviews were conducted by the first author, a prehospital nurse with 20 years' working experience in the EMS, who has not had any professional or personal contact with the participants beforehand. Purposeful sampling [23] was used, aiming to achieve variation (gender, age, urban/rural area, primary condition) among participants without risking patient safety. The inclusion criteria were as follows: the patient was transported by the EMS to the ED after an emergency call to the emergency response centre (ERC). The patient was assessed as low priority in the ED or the patient was transported to the hospital as high priority, but the priority was assessed as low after treatment in the ED. The patients needing urgent treatment in the ED, patients under the influence of alcohol (based on ED nurses' assessment) or drugs and inter-hospital transports were excluded. Additional exclusion criteria were being younger than 18 years of age, incapability of communicating in Finnish, or presence of dementia, confusion, or terminal disease. ED nurses identified eligible participants. The first author received a list of eligible participants from the ED nurse, gave oral and written information about the study and asked about participation after patients had received their initial assessment and treatment at the ED.

All interviews were performed on weekdays between 8 am to 4 pm, although some of the interviewed patients had been transported to the ED in the night-time. The first, second, and last authors (the first and last authors with working experience in EMS as prehospital nurses, and the second author with experience as an EMS physician) together devised the interview

questions. The interviews started with an open-ended question: "*Can you tell me about your experience of the EMS encounter?"* To encourage patients to share their experiences, additional questions were asked concerning waiting time, assessment, treatment, transportation, and the handover at the ED. The interviews were concluded by asking the patients to describe what made them feel safe or insecure during the EMS encounter. The interview guide is presented in supplementary file 1. The authors held multiple discussions during the data collection. The interviews lasted between 10 and 20 minutes. The interviews continued until no new information was obtained during the interviews. The variations in the interviews started to be limited during interview 15, but six more interviews were conducted aiming to ensure that no new variations would emerge. All the interviews were recorded with a digital recorder and transcribed verbatim by the first author. All the transcriptions were anonymised. Two of the interviews were translated from Finnish into English to achieve transparency among all authors participating in the study.

Patient and public involvement

The patients or the public were not involved in the design and conduct of this study.

Data analysis

An inductive qualitative content analysis was used to analyse the data[24]. The analysis began after all interviews had been listened to and transcribed. The text was then read several times to obtain a sense of the whole and to identify the patients' expressions about their perceptions of safety in the EMS. The expressions were single words or short sentences. The third author, who had no experience in EMS, but had working knowledge of patient safety research, read the transcripts with the aim of increasing the reliability of the process and verifying the first phase of open coding, in which similar expressions received

the same open code. The coding was made without using any software for analysis. An example of the coding tree is presented in supplementary file 2.

After the open coding, the codes were collected into a sheet with other related codes. These coding sheets were then abstracted into sub-categories, which were grouped into generic categories and finally into the main category. During the analysis, there was a recurrent movement between the whole and the parts. The authors held multiple discussions to ensure the reliability and credibility of the analysis, keeping the balance between their pre-understanding and openness to the content during the analysis. In every phase, the analysis continued until consensus between the researchers was reached. The last phase in the analysis was the conceptualization of the results, displayed in Figure 1.

Ethical considerations

This study was approved by the Ethics Committee of Helsinki University Hospital (HUS/3529/2017). The patients received written information about the purpose of the study with contact information for the responsible researcher, and they had the possibility to ask the first author questions about the research. The patients filled out a form affirming their voluntary participation in the study. The patients were informed that they have the right to withdraw from the study at any phase. During the interviews, the first author observed the patients and discontinued the discussion if any changes occurred in the patient's physical or mental condition.

RESULTS

In total, 22 patients were asked to participate, 21 of whom agreed to participate in the study. One male refused the interview without providing a reason. Some of the patients had used EMS more than once and for some of them, this was a first contact to the EMS.

The main reason for seeking EMS care was cardiac-related symptoms or breathing difficulties, as displayed in Table 1. Two of the patients did not describe their health problem or the reason for requesting an ambulance.

Table 1. Description of patients.

	Female n=12	Male n=9
Age range (mean)	44–91 (74.5)	41–86 (68.1)
Transported from urban area	7	5
Transported from rural area	5	4
Primary condition as patients described		
Breathing difficulties	4	1
Cardiac-related symptoms	3	2
Gastrointestinal problems	2	1
Lower body pain	1	1
Minor injury	-	2
Neurological symptoms	-	2
Missing data	2	-

The main category *Patients' confidence in the EMS* shows that the patients feel safe in the EMS and have confidence in EMS personnel. The patients' confidence in the EMS personnel were divided in two generic categories: *EMS personnel's social skills* and *circumstantial factors affecting patients' care*. EMS personnel's social skills and professional competence consist of subcategories *equal treatment, information, involvement in care decisions* and *EMS personnel's professional competence*. Circumstantial factors affecting patients' care is composed of subcategories *environmental factors* and *EMS personnel's driving skills*. (Figure 1). The generic categories with their sub-categories are presented below with illustrative quotations.

EMS personnel social's skills and professional competence

The EMS personnel's social skills and professional competence that affected patients' sense of safety in EMS included being treated equally, receiving information, being involved in their care, and getting professional treatment.

Equal treatment

According to the patients, equal treatment and a reliable patient-EMS personnel relationship generated a sense of safety in the EMS. The patients noted that it is essential that the EMS personnel's behaviour is calm, natural, and friendly. They expressed that a bit of humour and small talk during the care lighten the atmosphere and help to create a good patient-EMS personnel relationship.

"They didn't feel like officials. They were like human to human." (Pt5)

On the other hand, patients said that they felt insecure or that the EMS personnel acted in a condescending way when the personnel's behaviour was rushed, negative or too official, or when the personnel lacked communication skills. The patients also stated that the EMS personnel did not always take their concerns seriously and sometimes ignored them altogether. This was reflected in how patients described situations where their mental and/or physical condition created a feeling of insecurity, e.g. if they had difficulties with breathing, felt lonely, or had to wait for the ambulance for a long time. Feeling insecure because of condescending treatment caused a sense of being unsafe among the patients.

"*Waiting is the worst, especially if you are alone and there isn't anyone with you." (Pt6)*

Information

Most patients mentioned that the EMS personnel handed over enough information about the assessments, a student presence, environmental conditions, treatment, and medication

as well as about driving with lights and sirens on. In addition, if the EMS personnel had contacted the hospital beforehand, the patients expressed that the information had transferred to the hospital personnel. The patients described that in these situations their treatment in the hospital started smoothly and quickly. However, some patients mentioned not getting enough information. Usually, the lack of information concerned what the EMS personnel has assessed, the assessments results or the patient's medication during care. Even these patients maintained confidence in the EMS personnel and their professionalism because of the feeling that they received help from EMS personnel. Lack of information thus had negligible impact on patients' feelings of safety in the EMS.

"Ambulance personnel interviewed me and they took all sorts of assessments and I don't know all the assessments they took." (Pt13)

Involvement in care decisions

According to the patients, their involvement in care decisions varied. The patients' possibility to affect their transport position had an impact on their sense of safety. Especially the ones suffering from breathing problems stated that they wanted to sit on the seat rather than lay on the stretcher even if they were placed in an upright position. However, EMS personnel usually ignored this wish without explaining why it was not possible. Although some of the patients said that they did not have the chance to influence how they were moved to the ambulance or what position or where to stay during the transport, they did not automatically consider it negative.

"They didn't let me walk anymore, they were pushing (with the stretchers) the old granny … it sort of gives a nice feeling that somebody is still taking care of the old granny." (Pt5)

In some situations regarding safety, the patients took an active role. For example, they asked the EMS personnel to put safety belts on or they asked to reduce ambulance speed if they felt that the speed compromised their safety.

> *"I said that at least put the seatbelt on me. If you drive off the road, I fly out of here (from the stretchers) because I don't have the seatbelt on." (Pt10)*

EMS personnel's professional competence

Patients stated that EMS personnel's professional competence made them feel safe during care. According to them, good professional competence means asking questions related to their health problems, background information about previous illnesses, medication, home situation, etc., and taking assessments and giving medication when needed. These factors made them feel that the treatment had started immediately and that the EMS personnel were interested in their health problem. Furthermore, the patients mentioned that when the EMS personnel supervised and gave guidance to the student it also had an effect on the patient's perception of the EMS personnel's professional competence. They noted that the EMS personnel mainly had good professional competence from their point of view.

> *"The guys inserted an IV* (intravenous cannula) *and did assessments. Very professional personnel inserted the IV into my forearm, so they are very well educated." (Pt11)*
>
> *"They took care of me and measured my blood pressure and gave me the medication orally and that made me feel safe." (Pt8)*

However, some of the patients perceived that the EMS personnel lacked professional competence, and this affected their sense of safety. This situation occurred when the EMS personnel were uncertain of what had caused the patients' health problem or when the patient became aware that the EMS personnel had a lack of knowledge, e.g. when the only solution to the problem in the EMS personnel's view was to transport the patient to the

hospital. In addition, when the personnel were unable to put in an IV, the patients interpreted it as a lack of professional competence. These factors made the patient feel uncertain and unsafe.

"They said that they don't understand, and they brought me here (hospital)... they tried to insert an IV in my forearm and it failed." (Pt3)

Circumstantial factors affecting care

Environmental factors (e.g. road and weather conditions, ambulance suspension, and conditions inside the ambulance during the transport) and driving skills create the circumstances where the EMS patients get treatment. These circumstantial factors were highlighted when the patients talked about their perceptions of factors affecting the care and sense of safety in EMS.

Environmental factors

Environmental factors markedly affect patients' feelings of safety in EMS. They feel that EMS provides an essential public safety function. Almost all of the patients interviewed had some preconceived notions of how the EMS works, expectations based on their own perceptions or on how the service has been described in the media. Quick response times increase their perceptions of safety. However, the experience of a quick response time varied between the patients. They mentioned that they felt safe while the ambulance transported them to hospital. They also described a feeling of relief and security when the EMS personnel arrived and brought help to them with good equipment.

" Because I know that every time when I call an ambulance, help is near." (Pt13)

Some environmental issues reduced the patients' feeling of safety or made them uncomfortable. Uncomfortable and narrow stretchers and difficulties in getting inside the ambulance impair the experience of the care. The experience of feeling bad increased if the

temperature was too hot or too cold during the transport. Bad, bumpy roads or poor suspension in the ambulance also made patients feel worse.

> *"Why did the ambulance have such bad and noisy suspension? Was the road so bad or was it the ambulance suspension?" (Pt10)*

EMS personnel's driving skills

For the most part, the patients felt that the EMS personnel had good driving skills, reflected in "smooth and fast transportation" or not driving too fast. Furthermore, if the driver took notice of the weather and road conditions and adjusted the driving style accordingly, the patient had an impression of good driving skills and safe transportation. However, some of the patients felt unsafe and insecure if the ambulance's speed was too high, especially if the weather conditions were bad or the roads were slippery or uneven.

> *"It was hailing, they were the size of ping pong balls, and other cars had stopped at the roadside but the ambulance was going very fast." (Pt10)*

DISCUSSION

Overall, the interviewed patients appeared to feel safe in the EMS and to have confidence in EMS personnel. Clearly, confidence in the care provider is the main factor affecting patients' sense of safety in the EMS. In addition, medical knowledge and driving skills are directly related to a positive sense of safety. However, the EMS personnel's professional competence and good driving skills are meaningless in maintaining the patients' confidence if the EMS personnel does not treat them in an equal and humane manner. Therefore, EMS personnel should become more aware of their social interactions and their importance to patients' perception of safety. In health care overall and in the EMS setting, it is crucial that health care workers support patient involvement in care decisions and provide relevant information to the patients. By seeing the patient as a team member and

involving them in their care[19,25], the EMS personnel can create a psychologically safe environment for the patients. Patients then are more likely to talk about their concerns, to get an experience of interaction, and to feel safe in the EMS encounter. In previous research, the Finnish patient safety experts stated that trust in the healthcare professionals and their attitudes towards patient participation in general are important, when involving patients in improving patient safety[26].

In this study, the perception of equality, the possibility to get information, and the involvement in care decisions affected the patient's sense of safety in the EMS. A previous study[27] showed that shared information and being treated in a friendly and respectful manner are important according to patients. If they feel objectified by the EMS personnel, this may cause a feeling of "suffering from care"[28], leading to a sense of unsafety. Previous knowledge of patient experiences of safety in hospital settings[18-20] highlights that being treated equally is important to patients, and based on our findings this is also true in the context of EMS.

In other healthcare settings, researchers establish positive associations between the patient experiences and patient safety and clinical effectiveness[29]. From the experiences, valuable information emerged on how to improve patient safety and the patient encounter in EMS. The EMS personnel's clinical judgment was important when patients described what makes them feel safe when cared for by EMS personnel. On the other hand, some of the patients had experienced, especially with driving, a situation that could have compromised the safety of the patient and the EMS personnel. A previous study reveals that EMS users value a short waiting time, confidence, professionalism and communication[30]. Our study points out that these same factors also influence their perceptions of their safety. However, in our study a short waiting time according to patients ranged from a few to 30 minutes.

In some respects, our findings are in line with the results described in former patient safety culture studies[6-9]. The categories *equal treatment, information* and *involvement in care decisions* reflect both the "social process" and the "psychological dimension"[7] or teamwork, communication and patient-centredness described in other studies[6,8-9]. On the other hand, the categories *EMS personnel's professional competence, environmental factors* and *EMS personnel's driving skills* reflect the "organizational dimension"[7] or leadership and evidence-based health care described in the other studies[6,8-9]. Like a study conducted in hospital setting suggests[31], error management should promote developing a strong safety culture that affords the patient a role in promoting safety in their care. Our study highlights the gap between what safety means to the EMS personnel or the EMS organization and what kind of perceptions patients had safety in the EMS encounter. Patient perception of safety in the EMS is not the same as actually receiving safe care. Therefore, EMS organizations and EMS personnel must continue to develop the other safety elements in the EMS.

Furthermore, based on this study and a former study[32], EMS personnel, EMS organizations, and vocational training providers need additional knowledge about factors affecting patients' sense of safety in the EMS. The EMS personnel require more education to improve their social skills and to be able to foster psychological safety for the patient. The curriculum in EMS personnel training should thus be expanded to include development of social skills. Therefore, in the future it could be beneficial to explore the social factor between EMS personnel and the patients by using ethnographic framework within observational study.

Study strengths and limitations

It could be a strength or a limitation that the researchers had a deep pre-understanding of the research topic. Our deep theoretical and clinical experience helps us to understand

patients' experiences of the EMS and also to put these into a clinical context despite the short interviews. However, theoretical and clinical experience could also cause a bias via a lack of openness to the subject. To reduce this potential bias, we moved back and forth between the interviews and the expressions and between the categories and the interviews during the analysis. In addition, one of the researchers had no experience with EMS, but had working knowledge of patient safety, and this reduced the risk of bias caused by preconceptions.

The patients were recruited from only one health care district area, which could reduce the transferability of the results. However, patients' characteristics cover common EMS patient groups according to the ERC official statistics and therefore it is reasonable to think that the results can be transferred to a similar context. According to the exclusion criteria, we did not interview high priority patients suffering for multiple traumas or other life-threatening conditions or inter-hospital transfers. These patients could have given valuable information their perceptions of safety when EMS personnel must use for example support equipment and different kinds of transfer methods.

The interviews were performed when the patient was admitted to the ED. This may also be considered a limitation or a strength: a limitation due to the patient's experiences of illness, a strength due to their memory of the EMS personnel and the EMS encounter being fresh and unaffected by other people's opinions. Because of the timing of the interviews, one might assume that the care in the EMS was still in the patients' recent memory. The short duration of the interviews may be a limitation and may have been caused by the patients' illness or fatigue. It is possible that the short duration would limit the depth of understanding. Even though the interviews were done alone with the patient, it is possible that the patients were hesitant to openly share their views. There could have been barriers to the patients disclosing their concerns caused by for instance "I do not want to be a troublemaker", "I do

not know how to raise my concern", or "I do not want to harm my relationship with members of the medical team"[33]. To reduce these concerns, the interviewer introduced herself as a researcher, wore casual attire, and informed the patient that interviews are analysed anonymously. Moreover, we informed the patients that participating or withdrawing or anything that they say will not influence their treatment in the hospital or EMS. Despite certain limitations, this study offers valuable insights into patients' perceptions of safety in EMS.

CONCLUSIONS

The EMS personnel's social interactions seem to be associated with patients' perceptions of safety. Thus, more attention should be directed to their social skills and their ability to create a psychologically safe environment for the patient. In addition, this study adds to the knowledge about the factors contributing to or reducing patients' perception of safety when attended to by EMS personnel. This information is valuable when EMS organizations design methods to involve patients in developing their safety performance.

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CONFLICT OF INTEREST

All authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed to this study as follows: study design (AV, VL, MC), data collection (AV), data analysis (AV, VL, ST), and writing the manuscript (AV, VL, MC, ST). All authors read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The data used and analysed during the study are available from the corresponding author on reasonable request.

CONCENT FOR PUBLICATION

Not applicable.

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Figure legend: Overview of the categories

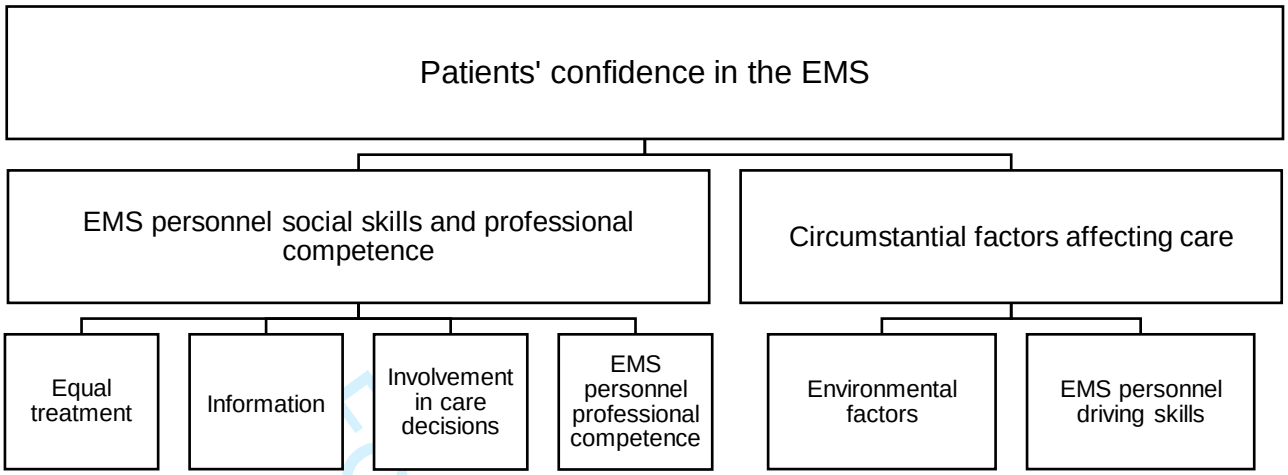

Figure 1. Overview of the categories.

Supplementary file 1: Interview guide

1. Can you tell me about your experience of the EMS encounter?
   - Additional questions:
     - Can you tell me more about the waiting time?
     - Can you tell me more about the assessment?
     - Can you tell me more about the treatment?
     - Can you tell me more about the transportation?
     - Can you tell me more about the handover at the ED?

2. What made you feel safe during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
3. Was there anything that made you feel insecure during the EMS encounter?
   - Follow up question if needed:
     - Can you tell me more about that?
4. Is there something else you want to tell me about the care in the EMS?

Supplementary file 2: Example of the coding tree

	Subcategories					
Patients' descriptions	Equal treatment	Information	Involvement in care decisions	Environmental factors	EMS personnel professional competence	EMS personnel driving skills
They weren't sort of formal. So, they were like a human next to a human. So, I feel that this is a very important thing at least for me personally. So, like if they look like officials/formal and just very formally ask these questions it is different than if they are not as formal. It creates a sort of pleasant feeling.	Don't feel nice if acting is too official Natural acting (not too official) makes relationship nice					
Well then, the ambulance staff interviewed me and they took all sorts of test and I don't know what they took but I think we were there for an hour and then they said that we should get to the hospital because it won't go away otherwise. So, then we came here and now I am here.		Lack of information about assessment and results				
And nothing else other than lie down inside the ambulance and cannula was inserted into my hand and I have type 1 diabetes so they took my blood sugar levels, there was nothing alarming in those readings and they asked if I want to have pain medications and I said I don't need any and every five minutes			Ask patient need for pain medication Ask patient feelings during the			

they asked if I was feeling ok. One of the paramedic's was chatting to me and taking down information and then we arrived at the hospital and we came into this treatment room and I could not imagine any better treatment or transportation or anything.			transport			
Well I did not hold on to anything, so I was just able to be sort of relaxed. But it did shake and bounce, so the road is worse there, but we got there regardless.				Shaky and bouncy ride Bad roads		
Well… They did investigations, like for example this morning. So, then they said that they don't understand so they will bring me here. Probably it was somewhat tricky what this illness may be, I don't know. Because it was only two weeks ago when I was here. The transportations were similar. And then when we left home they apparently stopped because I felt that it can't be this smooth on the road. They tried to insert, and it failed so it was not inserted (shows cannula). They can insert it soon at the hospital, apparently the veins are so fragile. That's why it failed. Yeah, I don't know what else to say.					Lack of knowledge (EMS personnel) Solution is to transport to the hospital Uncertainty to put an IV (paramedics try first and then decide to leave it to the hospital)	
It was good because I was tied securely so I did not sway, and the ambulance						Not driving too

driver did not drive recklessly and then I knew it was safe to be aboard on the way to get treatment. And to be in expert hands.						fast Sens of safety when get transported to hospital

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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