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Caring science research in the ambulance services: an integrative systematic review

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Caring science research in the ambulance services: an integrative systematic review

Background: The ambulance services are associated with emergency medicine, traumatology and disaster medicine, which is also reflected in previous research. Caring science research is limited and, since no systematic reviews have yet been produced, its focus is unclear. This makes it difficult for researchers to identify current knowledge gaps and clinicians to implement research findings.
Aim: This integrative systematic review aims to describe caring science research content and scope in the ambulance services.
Data sources: Databases included were MEDLINE (PubMed), CINAHL, Web of Science, ProQDiss, LibrisDiss and The Cochrane Library. The electronic search strategy was carried out between March and April 2015. The review was conducted in line with the standards of the PRISMA statement, registration number: PROSPERO 2016:CRD42016034156.
Review methods: The review process involved problem identification, literature search, data evaluation, data analysis and reporting. Thematic data analysis was undertaken using a five-stage method. Studies included were evaluated with methodological and/or theoretical rigour on a 3-level scale, and data relevance was evaluated on a 2-level scale.
Results: After the screening process, a total of 78 studies were included. The majority of these were conducted in Sweden (n = 42), fourteen in the United States and eleven in the United Kingdom. The number of study participants varied, from a case study with one participant to a survey with 2420 participants, and 28 (36%) of the studies were directly related to patients. The findings were identified under the themes: Caregiving in unpredictable situations; Independent and shared decision-making; Public environment and patient safety; Life-changing situations; and Ethics and values.
Conclusion: Caring science research with an explicit patient perspective is limited. Areas of particular interest for future research are the impact of unpredictable encounters on openness and sensitivity in the professional–patient relation, with special focus on value conflicts in emergency situations.

Keywords: ambulance, caring science, emergency medical services, holistic approach, prehospital, patient perspective, review, systematic.

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Background

Prehospital emergency care is mainly provided by the ambulance services as part of the Emergency Medical Services (EMS) (1). While EMS systems are based on the same principles in the delivery of emergency care for patients with trauma and life-threatening illnesses, the systems differ when it comes to care in non-life-threatening situations (2).

Generally, health care provided by ambulance professionals is often associated with emergency medicine, traumatology and disaster medicine. This focus on emergency, trauma and disaster is also reflected in previous research, leaving a rather scant volume of research in other areas such as caring science where the patients' perspective on health care is taken into consideration (3).

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In some countries, Registered Nurses (RNs) have become a fairly new profession in the ambulance services in addition to paramedics, emergency medical technicians (EMTs) and physicians. RNs' entry into the context of prehospital emergency care is in response to the need for two valued and different but not contradictory sciences, that is professional-based nursing science and transdisciplinary caring science that includes more than nursing practice.

Nursing science *focuses on the human-universe-health process articulated in nursing frameworks and theories* (4: 51). This discipline-specific knowledge is focused on the development and use of knowledge including nursing's unique phenomenon of concern. Caring science has been developed as a human science based on existential philosophy reviewing the spiritual basis of caregiving, in which caring is the moral ideal of nursing (5). *The five core attributes of caring are relationship, action, attitude, acceptance, and variability* (6: 641). In the Nordic tradition, caring science is based on the patient perspective *where the patient's world, vulnerability, health and suffering are primary in the art and act of caring* (7: 288). Lifeworld-led caring is one theory in the Nordic tradition, developed from a phenomenological lifeworld perspective (8).

Theoretical framework and the study aim

Caring science is an autonomous knowledge discipline based on an ethical patient perspective with the research interest directed at patients, spouses and families and healthcare professionals. The aim was to understand what good care is and how it can be achieved. Caring science is characterised by a holistic approach to the patient, thus also considering the existential dimension. The research contributes to understanding of health, environment, suffering, well-being and caring. The research results are the basis for the development of theory of health and caring, which is applied in the patient care process (7, 9).

When it comes to caring science research in the prehospital emergency care context, there are no systematic reviews that provide perspicuous knowledge on previous research. Therefore, the aim of this integrative systematic review has been to describe content and scope in caring science research in the ambulance services.

Methods

An integrative systematic literature review method was used that included studies with diverse methodologies, with a process involving problem identification, literature search, data evaluation, data analysis and reporting (10). The review was conducted and reported in line with the standards of the PRISMA statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (11). The registration number is PROSPERO 2016: CRD42016034156.

Ethical issues

Good ethical practice in preparing and publishing systematic reviews was applied, which means that the authors have been aiming for transparency, accuracy and avoidance of plagiarism (18). By following the PRISMA statement and registration in PROSPERO, the authors avoided redundant (duplicate) publications. Thus, this review builds on a protocol consisting of a 17-item checklist that describes the rationale and planned methods of the review.

Literature search strategy

The literature search was carried out between March and April 2015. Databases included were MEDLINE (PubMed), CINAHL, Web of Science, ProQDiss, LibrisDiss and The Cochrane Library. Medical Subject Headings (MeSH) (12) were used when possible, but some suitable search terms did not, however, exist as MeSH terms.

A series of comprehensive searches was carried out. The following keywords were chosen: 'Emergency Medical Services', 'Emergency Care', 'Emergency Medicine', 'Emergency Nursing', 'Evidence-Based Emergency Medicine', 'Prehospital'/'Prehospital Care', 'Ambulance Service', 'Ambulance Diversion', 'Air Ambulance', 'Out-of-hospital', 'Out-of-hospital Cardiac Arrest', 'Emergency Department', 'Emergency Room', 'Emergency Nurse', 'Emergency Nurse Practitioner', 'Paramedic', 'Emergency Medical Technician' and 'Transportation of Patient'.

The inclusion criteria were (i) peer-reviewed studies, (ii) published between January 2000 and April 2015, and (iii) written in English, Spanish, Swedish, Norwegian or Danish. Exclusion criteria were studies in (i) healthcare organisation and management; (ii) the context of Emergency Departments that did not include the prehospital phase; (iii) the ambulance professionals' work environment not involving patients; (iv) intrahospital transports; and (v) areas involving the armed forces/military, and disaster.

Articles were divided between the authors and screened independently in relation to the inclusion/exclusion criteria, first the titles and later the abstracts. The researchers had regular meetings to discuss the process and thus strengthen selection reliability. The discussions continued until consensus was reached between all four authors. In total, 78 studies (73 articles and five monographies) were deemed eligible for final inclusion (Fig. 1).

Data evaluation

Authenticity, methodological quality and data relevance were considered in the evaluation process (10, 13).

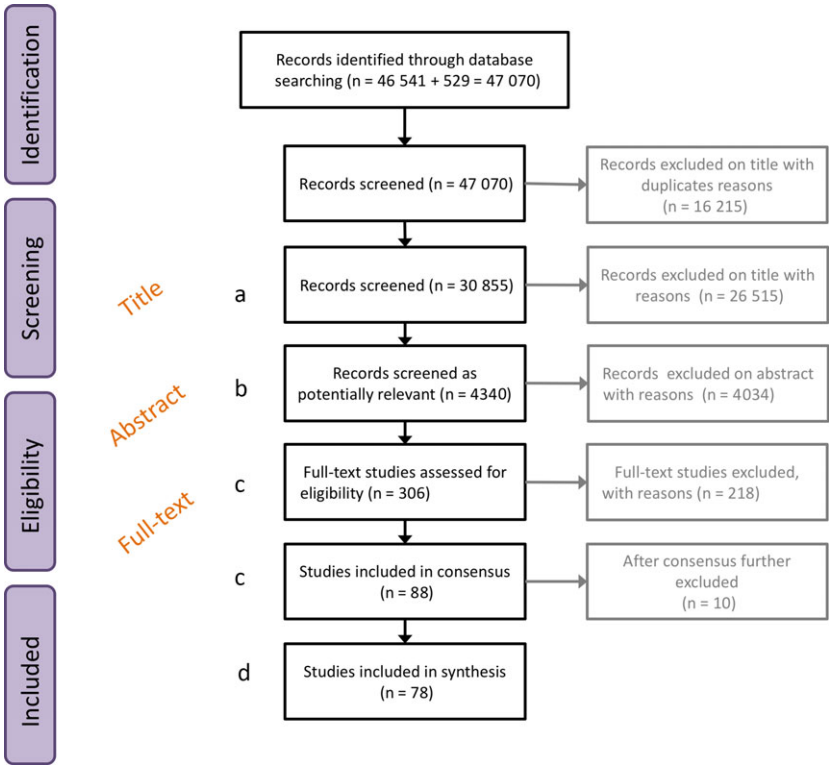

Figure 1 The inclusion and exclusion process.

Studies included were evaluated with methodological and/or theoretical rigour on a 3-level scale (high, medium or low) (14). The studies were also evaluated according to data relevance on a 2-level scale (high or low) (see Table 1). No study was excluded based on these two evaluations.

Characteristics of studies

Most of the studies included were conducted in Sweden (n = 42), fourteen in the United States and eleven in the UK. The number of participants varied, from a case study with one participant to a survey with 2420 participants. The studies were directly related to patients (n = 28), spouses and families (n = 7), professionals (n = 35), combinations of these (n = 7) and to students (n = 2). Empirical qualitative studies dominated by totally 56 studies of which one was a combination of theoretical and empirical study. The five monographies included focused on ethical aspects, attitudes and cultural barriers. No published article could be found associated with these monographies.

Data analysis

Thematic analysis with a systematic and inductive approach was used (15–17). Familiarisation with the data involved careful reading and re-reading until researchers reached an understanding of the wholeness in the studies reviewed. Initial codes were generated according to the researchers' initial ideas about what the studies were all about. A 'data-driven' and open coding was applied. Codes were identified, and the studies were organised into meaningful groups. Searching for themes was intended to refocus on themes, which involved sorting codes into potential themes, by considering how codes could be combined into an overarching theme. Sorting into themes and subthemes was done until the patterns were meaningful in relation to the study aim. Reviewing themes consisted of two levels of reviewing and refining themes. Level one involved reviewing the coded data, that is reviewing the affinity in the codes under the respective themes. Level two involved a similar process, but in relation to the entire data set. Defining and naming themes started when a thematic map with five themes was developed. The interpretation was discussed and finally agreed upon between all the authors.

Findings

The findings are presented with five themes: Caregiving in unpredictable situations; Independent and shared decision-making; Public environment and patient safety; Life-changing situations; and Ethics and values (Fig. 2). These

Table 1 Summary of the reviewed studies (n=78)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Abelsson et al. (2012) Sweden (31)	Qualitative	To describe specialist ambulance nurses' perceptions of assessing patients exposed to severe trauma	Specialist ambulance nurses (n = 15)	Individual interviews Phenomenography	To be prepared for emergency situations, confidence in one's own leadership and developing professional knowledge	Medium	Low
Ahl et al. (2005) Sweden (57)	Qualitative	To examine distinguishing characteristics of ambulance care	Paramedics (n = 5), ambulance nurses (n = 5)	Individual interviews Qualitative content analysis	Ambulance-based care is a complex field of practice that demands flexibility and humility in caregivers when they meet patients. It calls for a great deal of experience-based knowledge. The team spirit among ambulance staff has both advantages and disadvantages. It helps individual members, particular novices, to rely on colleagues in demanding situations, but occasionally blurs the line between good caring and collegiality	Low	Low
Ahl et al. (2006) Sweden (64)	Qualitative	To analyse patients' experiences related to the decision to call an ambulance and the wait for it to arrive	Patients (n = 20)	Individual interviews Qualitative content analysis	Calling for an ambulance is a major decision that is preceded by hesitation and attempts to handle the situation by oneself	Medium	High
Ahl et al. (2012) Sweden (26)	Qualitative	To interpret and explain experiences of caring in prehospital care situations that are not defined as traumatic or life-threatening	Patients (n = 20)	Individual interviews Interpretative analysis	Prehospital caring is an interplay between career(s) and patients with potentials for positive as well as negative outcomes	High	High
Aléx et al. (2013) Sweden (75)	Qualitative	To explore patients' experiences of being cold when injured in a cold environment	Patients (n = 20)	Individual interviews Qualitative content analysis	Patients suffered more from the cold than the pain from the injury. Patients who received active heat supply experienced it in a positive way	Medium	High
Aléx et al. (2013) Sweden (78)	Quantitative Observational	To investigate injured and ill patients' experiences of cold exposure and to identify related factors	Patients (n = 62)	Observation and structured questions	In the ambulance, 85% of the patients had a finger temperature below comfort zone and 44% experienced the ambient temperature in the patient compartment in the ambulance to be cold	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Aronsson et al. (2014) Sweden (83)	Qualitative	To describe and explain older patients' lived experiences of prehospital emergency care in cases of suspected hip fractures	Patients (n = 10)	Individual interviews Reflective lifeworld research	The patients experienced to be 'Glad to have been rescued, despite bad experiences as well as good'. Older patients were offered care in an open and friendly atmosphere concurrently with feeling anxiety about the treatment. Patients experienced confusion and they needed to ask questions about what really happened	High	High
Berben et al. (2012) Netherlands (30)	Qualitative	To give insight into facilitators and obstacles in pain management in trauma patients in the chain of emergency care	Managers (n = 10), Paramedics, physicians, emergency nurses (n = 23)	Individual interviews and focus group discussions Thematic content analysis	Facilitators or obstacles were in accordance with knowledge, attitude, professional communication, organisational aspects and patient input	Medium	High
Berg et al. (2012) USA (91)	Quantitative Prospective cross-sectional	A predictive model was hypothesised to show that patient perceptions of technical care (competency) could be predicted by judgements of interpersonal care (courtesy)	Patients (n = 278)	Telephone survey, questions	Structural equation modelling indicated a significant direct effect of perceptions of interpersonal care on perceived technical care (PTC) and PTC on global satisfaction	Medium	Low
Berntsson et al. (2013) Sweden (24)	Qualitative	To explore how the prehospital nurse–patient relationship is emerging in specialist ambulance nursing students' descriptions of ambulance missions	Student written reports (n = 17)	Qualitative content analysis	Four phases of the prehospital nurse – patient relationship could be identified and each phase included several different parts. Furthermore, the results showed that the parts of each phase could vary depending on the patient's condition and the environmental circumstances of the ambulance mission	Medium	Low
Braithwaite (2014) USA (93)	Doctoral theses Qualitative	To understand how paramedics perceived ethics in patient care, specifically the process of navigating ethical decision-making in emergent situations	Paramedics (n = 13)	Individual interviews Interpretative analysis	Participants did not routinely use a process-driven application as they made emergent decisions. They did, however, frequently consider feelings of empathy as they navigated such decisions. The participants learned ethical decision-making from peers and mentors in a community of practice through experiential learning, and then critically reflected on ethical dilemmas within the same community	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Bremer et al. (2009) Sweden (69)	Qualitative	To describe patients' experiences of surviving out-of-hospital cardiac arrest (OHCA), focusing on how OHCA influenced their well-being over time	Patients (n = 9)	Individual interviews Lifeworld phenomenology	Out-of-hospital cardiac arrest (OHCA) is a sudden and elusive threat, an awakening in perplexity, and the memory gap is a loss of coherence. Survival means a search for coherence with distressing and joyful understanding, as well as existential insecurity exposed by feelings of vulnerability. Well-being is found through a sense of coherence and meaning in life. Survivors' emotional needs and a potential for prehospital emergency personnel to support them as they try to make sense of what has happened	High	High
Bremer et al. (2009) Sweden (72)	Qualitative	To describe the experiences of significant others present at out-of-hospital cardiac arrest, focusing on ethical aspects and values	Significant others (n = 7)	Individual interviews Lifeworld phenomenology	The phenomenon of OHCA can be stated as unreality in the reality, characterised by overwhelming responsibility. Significant others experience inadequacy and limitation, they move between hope and hopelessness, and they struggle with ethical considerations and an insecurity about the future. The findings show how significant others' sense of an OHCA situation, when life is trembling, can threaten values deemed important for a good life	Medium	High
Bremer et al. (2011) Sweden (94)	Theoretical, philosophical	To explore and discuss the arguments supporting the use of futile CPR to benefit significant others and ambulance professionals	Theoretical study (n = 1), Case study (n = 1), Empirical study (n = 1)	Reflective equilibrium Ethical and normative analysis	The support for providing physiologically futile cardiopulmonary resuscitation (CPR) in the prehospital context fails. The strategy of ambulance professionals in the case of a sudden death should focus on the relevant care needs of the significant others and provide support, arrange for a peaceful environment and administer acute grief counselling at the scene. This might call for a developed competency	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Bremer et al. (2012) Sweden (95)	Qualitative	To analyse EMS personnel's experiences of caring for families when patients suffer cardiac arrest and sudden death	Paramedics (n = 2), Prehospital emergency nurses (n = 5), Specialist nurses (n = 3)	Individual interviews Hermeneutical, lifeworld phenomenology	The personnel felt responsible for both patient care and family care, and sometimes failed to prioritise these responsibilities as a result of their own perceptions, feelings and reactions. Moving from patient care to family care implied a movement from well-structured guidance to a situational response, forcing to balance between interpretive reasoning and a more direct emotional response. The ability to recognise and respond to people's existential questions and needs was dependent on the personnel's balance between closeness and distance, and on their courage in facing the emotional expressions of the families, as well as the personnel's own vulnerability	High	Low
Bruce et al. (2005) Sweden (59)	Qualitative	To explore the experiences of nurses receiving patients who were brought into hospital as emergencies by ambulance crews through an analysis of the handover and triage process	Emergency nurses (n = 6)	Individual interviews Lifeworld phenomenology	The interplay between prehospital and hospital personnel is vital for the patients. Prehospital reporting was experienced as a dialogue for planning, the symbolic handover and the ideal and nonideal handover	Medium	High
Burrell et al. (2013) UK (32)	Qualitative	To examine the decision-making of ambulance clinicians when attending to persons with epilepsy, exploring their perceptions of which factors influence their decisions	Paramedic (n = 9), EMT (n = 5), ECP (n = 1)	Individual interviews Thematic analysis	Patients with epilepsy may be taken to the emergency department (ED) not because of a specific clinical need but because the attending ambulance clinicians often do not feel sufficiently confident or informed to be able to assess the patients' medical needs adequately	Low	Low
Chandran et al. (2014) USA & Pakistan (66)	Qualitative	To analyse patient perspectives of the ambulance system in Karachi to understand how to improve ambulance use	Patients (n = 30)	Individual interviews Thematic analysis	Major themes that affect patients' decision-making with regard to ambulance use were a mistrust of the ambulance system or providers and a sense of inadequacy of the local system as compared with international standards. There was a fundamental misunderstanding of the role of ambulance services in the healthcare infrastructure	Low	Low

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Chew et al. (2008) Malaysia (86)	Quantitative Prospective cross-sectional	To find out the public's perception and expectations of the ambulance services in one university hospital	Patients (n = 87)	Structured individual interviews	The ambulance personnel were perceived as attentive and gentle by the patients. The equipment and comfort in the ambulance were rated as not so good by the patients	Low	Low
Cleaver (2012) UK (55)	Doctoral theses Mixed methods	To explore the attitudes of emergency care staff towards young people (aged 12–18 years) who self-harm and to gain an understanding of the basis of attitudes that exist	Personnel in ED/ambulance (n = 143), Personnel in ED/ ambulance (n = 12)	Questionnaire Individual interviews Triangulation and convergent design	Age does influence attitudes towards self-harm. Nurses have less positive attitudes than their peers working in emergency services. The nurses surveyed in this study obtained lower scores on the scale used to measure attitudes than their medical and paramedical colleagues. The interviews illustrated the difficulties and frustration in managing the care of young people who self-harm, which centred on the pressure to 'move young people on', pressures that were exacerbated by the need to do this within 4 hours. The paramedics interviewed did not face these challenges	High	High
Compton et al. (2006) USA (45)	Quantitative Observational cross-sectional	To describe EMS providers' experiences with family member presence during resuscitation and to determine whether those experiences are similar within urban and suburban settings	EMS providers (n = 128)	Questionnaire	The majority of urban and suburban providers felt it was inappropriate for family to witness resuscitations. Many providers reported feeling uncomfortable with family presence. A minority believed that family were better prepared to accept the death of the patient. Approximately half of the professionals felt comfortable providing emotional support after family presence during resuscitation. Urban providers more often reported feeling threatened by family members during resuscitation and felt that family members often interfered with their ability to perform resuscitation	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Cottrell et al. (2014) USA (38)	Qualitative	To understand EMS providers' experience providing emergency care for children and their perceptions of the range of factors that contribute to or increase the risk of paediatric safety events in the prehospital emergency setting	Focus groups (n = 4) with EMS providers (n = 40)	Focus group discussions Grounded theory-content analysis	Participants cited challenges such as lack of appropriately sized equipment or standardised paediatric medication dosages, insufficient human resources, paediatric training and aspects of Emergency Medical Services culture. Poor communication among team members, communication problems with the child and family, and an overall lack of experience with children coupled with heightened anxiety when responding to calls involving children. And errors in assessment and decision-making	High	High
Cox et al. (2006) UK (44)	Qualitative	To describe ambulance paramedics' perceptions of their role in delivering thrombolytic treatment	Focus group (n = 2) with Paramedics (n = 20)	Focus group discussions Content analysis	Paramedics' perceptions of their role in prehospital thrombolysis were mixed, encompassing professional and political issues including lack of ownership of the emerging national strategy, desire for national certification and financial reward	Medium	Low
Donohue et al. (2009) USA (67)	Mixed methods	To characterise parents' perception of back-transport of very low-birth-weight infants from a regional referral neonatal intensive (NICU) to a community hospital (CH) for convalescent care	Parents (n = 236)	Individual telephone interviews Constant comparative analysis	Overall, 20% of parents selected the CH to which their child was transferred. Less than half of the parents wanted the transfer. Psychological comfort with the regional referral NICU was the most frequently reported reason for opposing transfer. At the time of home discharged, most parents were satisfied with transfer and felt prepared to care for their infant at home	Medium	Low
Doohan et al. (2015) Sweden (71)	Qualitative	To explore the survivors' experiences after a major bus crash	Patients (n = 54)	Individual telephone interviews Qualitative content analysis	Prehospital discomfort, lack of compassionate care, dissatisfaction with crisis support and satisfactory initial care and support are the categories. Lack of compassion caused distress among survivors, and various needs for support were not met	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Edwardsen et al. (2002) USA (87)	Quantitative Prospective cross-sectional	To determine the acceptance by family members regarding none transport of patients in cardiac arrest following unsuccessful resuscitation occurring in private residence	Family members (n = 33)	Individual telephone interviews	Satisfied with both the medical care and the emotional support provided by EMS. Patient that had been transported by ambulance to hospital, the family members would have preferred to have the patient die at home instead of being transported	Medium	High
Elmqvist et al. (2008) Sweden (27)	Qualitative	To describe and understand the patient's first encounter with prehospital emergency care as experienced by the patient and the first responders	Patients (n = 4), Next of kin (n = 1), Policeman (n = 8), Firemen (n = 2), ambulance staff (n = 3)	Individual interviews Lifeworld phenomenology	The patient needs to retain his or her identity by means of a communicative contact, to be confirmed in the lived encounter and to recapitulate the elapsed time of the unexpected event in order to regain a state of equilibrium. The variations of the patients' first encounter; the encounter with the helpless injured body, the confirmation in existential encounter, the encounter while waiting, the lived encounter and the recapitulated encounter	Medium	High
Elmqvist et al. (2010) Sweden (25)	Qualitative	To describe and understand experiences of being the first responder on the scene of an accident, as described by policemen, firemen and ambulance staff	Policeman (n = 8), Firemen (n = 2), ambulance staff (n = 3)	Individual interviews Lifeworld phenomenology	Experiences of being the first responder on the scene of an accident are expectations of carrying out a systematic course of action, dressed in the role of a hero and at the same time being genuine in an interpersonal encounter. This entails a continuous movement between 'being' and 'doing'. It is not a question of either-or, instead everything is to be understood in relation to each other at the same time	Medium	High
Forslund et al. (2014) Sweden (70)	Qualitative	To elucidate meanings of people's lived experiences of surviving an OHCA with validated myocardial infarction (MI) aetiology, 1 month after the event	Patients (n = 11)	Individual interviews Phenomenology hermeneutical	There were two themes, (1) returning to life and (2) revaluing life, and five subthemes, (1a) waking up and missing the whole picture, (1b) realising it was not time to die, (2a) wondering why and seeking explanations, (2b) feeling ambiguous in relations, and (2c) wondering whether life will be the same	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Forslund et al. (2005) Sweden (62)	Qualitative	To illuminate how patients with acute chest pain experience the emergency call and their prehospital care	Patients (n = 13)	Individual interviews Phenomenology hermeneutical	The patients were grateful that their lives had been saved and were generally satisfied with their contact with the emergency operator and the ambulance personnel. Sometimes, they felt that it took too long for the emergency operators to answer and to understand the urgency. In a life-threatening situation, feelings of vulnerability and dependency were great. Time seemed to stand still while they were waiting for help during their traumatic experience. The situation was fraught with pain, fear and an experience of loneliness	Medium	High
Forslund et al. (2008) Sweden (61)	Qualitative	To illuminate how spouses to persons with acute chest pain experienced the alarm situation, the emergency call and the prehospital emergency care	Spouses (n = 19)	Individual interviews Phenomenology hermeneutical	Experienced in managing the challenges of responsibility, uneasiness and that a sense of aloneness rose. When their partners' life was at risk, the spouses were in an escalating spiral of worry, uncertainty, stress, fear of loss, feeling of loneliness and desperation	High	High
Gunnarsson et al. (2009) Sweden (36)	Qualitative	To investigate the factors that influence decision-making among ambulance nurses in emergency care situations	Ambulance nurses (n = 14)	Individual interviews Qualitative content analysis	The nurses' experience is important for decision-making, with qualitative differences in comparison with novice nurses. External factors, such as uncertainty of a prehospital environment, expectations and pressures from other people and collaborating with many different operators, all contribute to making decisions in an urgent situation more complex	Low	Low

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Halter et al. (2011) UK (33)	Qualitative	To understand the decision-making processes of emergency ambulance staff with older people who have fallen	Ambulance staff (n = 12)	Individual interviews Thematic analysis	Assessment and decision-making processes are identified. Pre-arrival: forming an early opinion from information from the emergency call. Initial contact: assessing the need for any immediate action and establishing a rapport. Continuing assessment: gathering and assimilating medical and social information. Making a conveyance decision: negotiation, referral and professional defence, using professional experience and instinct	Medium	High
Henriksson et al. (2015) Sweden (76)	Quantitative. Observational cross-sectional	To evaluate the effect on metabolic rate, body core temperature, skin temperature, total body heat storage, heart rate and cold discomfort in cold stressed subjects	Volunteers (n = 8)	Observations	Wet clothing removal or the addition of a vapour barrier significantly reduced metabolic rate and increased skin temperature rewarming. Cold discomfort was significantly lower with the addition of a vapour barrier and with two woollen blankets compared with one woollen blanket alone	Medium	Low
Holmberg et al. (2010) Sweden (19)	Qualitative	To describe RNs' experiences of being responsible for the care of the patient in the ambulance service	RNs in the ambulance service (n = 5)	Individual interviews Lifeworld phenomenology	The essence of the phenomenon is to prepare and create conditions for care and to accomplish care close to the patient. Three meaning constituents: prepare and create conditions for the nursing care; be there for the patient and significant others; and create comfort for the patient and significant others	High	High
Holmberg et al. (2014) Sweden (85)	Qualitative	To elucidate the meaning of the relationship with the ambulance clinicians as experienced by patients	Patients (n = 20)	Individual interviews Lifeworld phenomenological hermeneutical	The main theme: To surrender independence to another. The main theme includes four subthemes: Being in the hands of another, Being in a caring temporary presence, Being important while involved and Being powerless while insignificant	High	High
Hultsjö et al. (2005) Sweden (54)	Qualitative	To identify whether staff in somatic and psychiatric emergency care experienced problems in the care of migrants, and if so to compare these	ED personnel (n = 12), ambulance personnel (n = 12), Psychiatric intensive care personnel (n = 11)	Focus group discussions Content analysis	There were a lot of nonemergency runs because of language barriers between the emergency services centre and migrants	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Iqbal et al. (2013) UK (42)	Qualitative	To investigate patients' and practitioners' views and experiences of prehospital pain management to inform improvement in care and a patient-centred approach to treatment	Patients (n = 17), ambulance clinicians (n = 25), ED clinicians (n = 13)	Focus group discussions Thematic content analysis	Five main categories described: (i) consider beliefs of patients and staff in pain management; (ii) widen pain assessment strategies; (iii) optimise nondrug treatment; (iv) increase drug treatment options; and (v) enhance communication and coordination along the prehospital pain management pathway. Patients and staff expected pain to be relieved in the ambulance; however, refusal of or inadequate analgesia were common	High	High
Jang et al. (2004) USA (34)	Quantitative. Cross-sectional	To assess the religious spirituality of EMS personnel and their perception of the spiritual needs of ambulance patients	EMT (n = 143), Paramedics (n = 89), Patients	Questionnaire	Ambulance personnel did not perceive spiritual concerns as often as reported by ambulance patients, nor did they commonly inquire about the religious/spiritual needs of patients	Low	Low
Johansson et al. (2007) Sweden (74)	Qualitative	To describe variations in how individuals perceived suffering symptoms of an acute myocardial infarction	Patients (n = 15)	Individual interviews. Phenomenography	To manage their situation, patients expressed a need to understand it and to have a similar situation to compare with. They also described coping with the threat arising to their lives by self-medication or denying their symptoms. Patients expressed vulnerability, with feelings of anxiety, both as triggers and obstacles to seeking medical care. In interaction with others, psychosocial support and guidance from the environment were fundamental in helping the patients to manage the situation	Medium	High
Johansson et al. (2008) Sweden (65)	Qualitative	To describe spouses' conceptions of the prehospital phase when their partners suffered an acute myocardial infarction	Spouses (n = 15)	Individual interviews Phenomenography	Two categories conceptualised the spouses' experiences. Being resourceful contained: sharing the experience, having knowledge, understanding the severity, being rational and consulting others. Respecting independence contained: accepting the need for control, marital roles and experiences, restraining emotions and seeking agreement	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Johansson et al. (2011) Sweden (88)	Quantitative Cross-sectional	To evaluate patient satisfaction within an ambulance care service using the Davis Consumer Emergency Care Satisfaction Scale	Patients (n = 40)	Questionnaire, Davis Consumer Emergency Care Satisfaction Scale©	Patients were pleased with the care received and the competence of the ambulance staff, and the patients experienced a high level of psychological and physical sense of security	Medium	Low
Jones et al. (2003) UK (39)	Qualitative	To explore paramedics' perceptions of patients in pain and the paramedics' perspective of prehospital pain management	Paramedics (n = 6)	Individual interviews Thematic content analysis	Four main themes were described: The patient's experience of pain, The evaluation of pain, Decision-making and Alternative methods. The participants described factors that they felt influence a patient's experience of pain, identifying a cultural difference existing in pain expression. Patients were not always perceived by the participants to be honest when describing their pain	Medium	Low
Jonsson et al. (2003) Sweden (23)	Qualitative	To uncover the essence of traumatic events experienced by ambulance personnel	EMT and RN ambulance (n = 223)	Written stories Phenomenology	At the scene of the accident, the meeting with the unforeseen and meaningless centred all attention on the victim. The ambulance personnel experienced strong compassion and identification with the victim. Afterwards, it was impossible to leave the meaninglessness behind without gaining understanding of what happened	High	High
Jonsson et al. (2004) Sweden (50)	Qualitative	To uncover and deepen the understanding of the way ambulance staff experience and handle traumatic events and to develop an understanding of the lifeworld of the participants	Ambulance nurses and ambulance technicians (n = 10)	Individual interviews Phenomenology	To handle PTS symptoms and feelings, it is necessary to talk about them with fellow workers, friends or family members. By using another person as a container, it is possible to encapsulate the traumatic experience	Medium	Low
Kober et al. (2002) Austria (82)	Quantitative Randomised Controlled Trial	To test the hypothesis that oxygen administration reduces nausea and vomiting in patients with minor trauma during ambulance transport	Patients (n = 100)	Control group: breathe air Intervention group: 100% oxygen at 10 L/minute through a facemask Pain, nausea, vomiting, anxiety and overall satisfaction rating on 100-mm scales.	Supplemental oxygen during ambulance transport reduced nausea scores by 50% and decreased vomiting fourfold. Patients reported greater satisfaction with their care when oxygen was administrated	Medium	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Lang et al. (2007) Austria (80)	Quantitative Randomised Controlled Trial	To evaluate the efficacy of transcutaneous electrical nerve stimulation (TENS) in acute post-traumatic hip pain patients during emergency transport	Patients (n = 63)	Intervention group: TENS (n = 30). Control group: standard treatment (n = 30) Questionnaires. Pain and anxiety scale	TENS is a valuable and fast-acting pain treatment under the difficult circumstances. Patients scored significantly reduced pain and anxiety after TENS	Medium	High
Larsson et al. (2013) Sweden (77)	Qualitative	To describe ambulance nurses' experiences of nursing patients suffering cardiac arrest	Ambulance nurses (n = 7)	Individual interviews Qualitative content analysis	Mutual preparation, regular training and education were important factors in the nursing of patients suffering cardiac arrest. Ambulance nurses are placed in ethically demanding situations regarding if and for how long they should continue cardiopulmonary resuscitation to accord with prehospital cardiac guidelines and patients' wishes	Medium	High
Lundgren et al. (2004) Sweden (79)	Quantitative Observational cross-sectional	To evaluate the effect on body core temperature, sensation of shivering and cold discomfort in cold stressed subjects by utilising additional insulation on a spine board	Volunteers (n = 19)	Immobilised on noninsulated (n = 10) Insulated (n = 9) spine boards Observation protocol	There were no differences between the two groups regarding reduction in body core temperature or cold discomfort. There was, however, a statistically significant increase in estimated shivering for the subjects placed on noninsulated spine boards	Medium	Low
Melby et al. (2005) Sweden & Norway (58)	Qualitative	To explore older people's experiences in prehospital emergency care and identify benefits and difficulties associated with developing a nurse-led ambulance service	Focus groups (n = 3) with ambulance nurses (n = 5) Paramedics (n = 4), Nursing students (n = 4, Older persons (n = 11)	Focus group discussion Individual interviews Thematic analysis	The care of older people in ambulance care; the main issues comprising: Holistic care; Satisfaction with care; Education and training vs. experience. The role of the nurse in ambulance care; the issues underpinning this were as follows: Holistic assessment and care; Role conflict	Low	Low

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Nollette (2001) USA (40)	Doctoral theses Quantitative	To examine the attitudes of EMS personnel in Texas regarding death and dying	EMS personnel (n = 228)	Questionnaire	Respondents reported very similar attitudes regarding death and dying; and a large majority of them indicated that they agreed that they had difficulty in dealing with their feelings or the feelings of their patients with regard to death and dying; agreed that EMS schools should place more emphasis on communication skills with dying patients and their families; disagreed that training EMS personnel on attitudes of death and dying was not appropriate; agreed that dying patients should be allowed to die without making an effort to prolong their lives; and agreed that patients sometimes give up when the medical profession gives up on them	High	High
Nordby et al. (2012) Norway (47)	Qualitative	To understand how paramedics experience difficult ethical dilemmas regarding resuscitation of cancer patients	Paramedics (n = 15)	Individual interviews Cognitive-emotional analysis	The participants believed that it can be ethically correct not to resuscitate if the patient is expected to survive for only a short time with a very low quality of life and severe negative illness experiences. This belief sometimes failed to match formal or informal guidelines and contextual factors such as expectations of relatives. The majority of the paramedics relied heavily on the advice of medical experts	Medium	High
Nordén et al. (2014) Sweden (41)	Qualitative	To describe ambulance nurses' experiences of nursing critically ill or injured children	Ambulance nurses (n = 8)	Individual interviews Qualitative content analysis	The security of both child and parents was considered to be paramount. Ambulance nurses felt relieved when they handed over the responsibility. The ambulance nurses felt that more training, education and follow-up was desirable in order to increase their security when nursing children	Medium	Low

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
O'Cathain et al. (2008) UK (29)	Qualitative	To explore patients' views and experiences of the emergency and urgent care system to inform the development of a questionnaire for routine assessment of the system's performance from the patient perspective	Focus group (n = 8) with patients (n = 47), individual interviews with patients (n = 13)	Focus group discussions and individual interviews Qualitative content analysis	Questionnaires designed to assess patients' views and experiences of emergency and urgent care should address system-level as well as service-specific issues in order to address the full range of patient concerns	Medium	High
Persse et al. (2002) USA (89)	Quantitative Prospective cross-sectional observational	To determine where a feedback loop providing paramedics with follow-up information about elderly patients not transported by ambulance would change their decision-making regarding ambulance transportation as reported by the patients	Patients (n = 349)	Individual interviews by telephone Data collection, pre/post-intervention (feedback)	The decision on not going to the hospital was the patient's own decision and/or mutual. The risk of not be transported was explained to the patients by the paramedics in majority of the cases and the patients were satisfied with the care	Medium	Low
Pugh (2002) Australia (37)	Qualitative	To describe flight nurses in emergency situations in which they were the sole health professional	Flight nurses (n = 6)	Individual interviews Thematic analysis	Ways of knowing the patient were formed by intuitive, experiential and objective knowing. The context of knowing was formed by an aviation environment, no or minimised involvement in triage, knowing colleagues, sole practitioner, experiential level and practice guidelines	Medium	High
Ridsdale et al. (2012) UK (63)	Qualitative	To explore the perspectives of adults with epilepsy who had attended the ED about who had made the call to the EMS and their rationale	Patients (n = 19)	Individual interviews Thematic analysis	A seizure alone was not the main explanation for attending EMS; knowledge, experience and confidence of those nearby on what to do and seizure context were important. Additionally, fears of sudden death held by the patients with epilepsy and others were reported	Low	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Sandman et al. (2006) Sweden (92)	Qualitative	To analyse and describe ethical conflicts faced by prehospital emergency carers in the EMS	Focus group interviews (n = 6) with RNs (n = 14), Paramedics (n = 15)	Focus group discussions Content analysis	Ethical conflict was found in different nodes of conflict: the patient/carer relationship, the patient's self-determination, the patient's best interest, the carer's professional ideals, the carer's professional role and self-identity, significant others and bystanders, other care professionals, organisational structure and resource management, societal ideals, and other professionals	Medium	High
Sharifi et al. (2012) Iran (90)	Quantitative Cross-sectional observational	To investigate the satisfaction of patients with Ambulance Service services in Shahrekord	Patients (n = 450)	Satisfaction evaluation questionnaire	Patients' satisfaction with emergency services and their quality is considered as one of the main concepts in prehospital emergency procedures, in the manner that the results of this study showed that patients' satisfaction in different fields was high but that technicians should allocate much more time for interaction with patients in order to improve their satisfaction	Low	Low
Stuhlmiller et al. (2009) USA (81)	Quantitative Cross-sectional observational	To evaluate the effect of music on ground critical care transport (CCT)-related subjective anxiety and assessed for objective evidence manifested by a change in vital signs	Patients (n = 23)	Questionnaires	Patients reported a positive impact of music on transport and that music made them feel more comfortable. There were no differences in patients' vital signs when listening to music during transport	Medium	Low
Suserud et al. (2003) Sweden (21)	Qualitative	To describe the scope and method of ambulance nurse assessment in prehospital emergency care	Ambulance nurses (n = 6)	Individual interviews Phenomenology	The ambulance nurses use their experience before meeting patients and when necessary can carry out active preparation by imaginative planning. When experienced nurses first meet patients, they need to be open to all information about the patient, situation and site appearance, whether in a home or at an accident site	Low	Low
Suserud et al. (2013) Sweden (51)	Qualitative	To explore whether ambulance clinicians in Sweden perceive their working environment to be safe	Ambulance nurses (n = 24), Paramedics (n = 9)	Individual interviews Qualitative content analysis	The perceived safety of patient care in ambulances was affected by use of safety belts; driving at high speeds; patient first, safety second; equipment design and placement; noise; driving styles; presence of relatives; documentation	Low	Low

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Thorén et al. (2010) Sweden (73)	Qualitative	To describe spouses' experiences of witnessing their partners' cardiac arrest at home, focusing on the time before the event and when it happened	Spouses (n = 15)	Individual interviews Qualitative content analysis	Before the cardiac arrest, there was a lack of early warning signs, difficulties in interpreting them, which was often done in the light of previous illness. Denial of serious illness emerged. During the event, spouses perceived the seriousness, felt unable to influence, and did what was their power	Low	High
Togher et al. (2013) UK (28)	Qualitative	To explore experiences of patients, who had accessed the ambulance service for AMI or stroke, and clinicians regularly treating patients for these conditions in the prehospital setting	Focus groups (n = 1) with clinicians Interviews patients (n = 22), ambulance service staff (n = 17)	Individual interviews and focus group discussion Thematic analysis	Four main themes emerged: communication, professionalism, treatment of condition and the transition from home to hospital. Patients focused on both personal and technical skills. Technical knowledge and relational skills together contributed to a perception of professionalism in ambulance personnel	Medium	High
Togher et al. (2015) UK (60)	Qualitative	To investigate the aspects of emergency ambulance service care valued by users	Patients (n = 22), Spouses (n = 8)	Individual interviews Qualitative content analysis	Users were often extremely anxious about their health, and the outcome they valued was reassurance provided by ambulance services staff that they were receiving appropriate advice, treatment and care. A timely response was valued in terms of allaying anxiety quickly	Medium	High
Toloo et al. (2013) Australia (68)	Quantitative Cross-sectional observational	To study the role and effect of patients' perceptions on reasons for using ambulance services	ED patients transported by ambulance (n = 223), patients using own or public transport (n = 619), patients (n = 69) using other transports	Questionnaires	Ambulance users had significantly higher self-rated perceived seriousness, urgency and pain than self-transports. They were also more likely to agree that ambulance services are for everyone to use, regardless of the severity of their conditions	High	High
Urbina (2001) USA (53)	Doctoral theses Quantitative	To explore cultural barriers to prehospital emergency medical care. Focused on clinical and nonclinical factors	Patients (n = 2420)	Participant observation	Several nonclinical factors have a strong effect on EMS patient diagnosis and treatment. There may be considerable differences in the diagnosis and treatment of patients who can and cannot speak English	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Walker (2014) UK (46)	Qualitative	To explore the lived experience of lay presence during an adult CPR attempt in primary (out-of-hospital) and secondary (in-hospital) care environments	RN (n = 12), ambulance staff (n = 8)	Individual interviews Thematic analysis	Participants portrayed a mixture of benefits and concerns. Familiarity of working in the presence of lay people, practical experience in emergency care and personal confidence were important antecedents. Divergent practices within and across the contexts of care were revealed	Medium	Low
Warden (2012) USA (96)	Doctoral theses Qualitative	To explore ethical quandaries that EMS personnel face and in a systematic way think through moral challenges they encounter	EMT, Paramedics (n = 5)	Case study	A moral agency that combines adherence to ethical norms with the inculcation of virtue will be best suited to assist EMTs and paramedics as they render care to their patients	Medium	High
Vicente et al. (2012) Sweden (35)	Qualitative	To identify and illuminate conditions that affect older people assessed with the assessment category 'generally affected health condition'	Patients' medical records (n = 88)	Medical records Qualitative content analysis	The concept of frailty clarifies the state of 'generally affected health condition', as either illness or ill-health. Progressive weakness and increased dependence lead to overturning a controlled and functioning life	Low	Low
Vicente et al. (2013) Sweden (84)	Qualitative	To describe patients' lived experience of participating in the choice of health care when offered an alternative care pathway by the EMS, when the individual patient's medical needs made this choice possible	Patients (n = 11)	Individual interviews Phenomenology	The essence of the phenomenon is described as 'There was a ray of hope about a caring encounter and about being treated like a unique human being'. Five meaningful constituents: endurable waiting, speedy transference, a concerned encounter, trust in competence and a choice based on memories of suffering from care	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Wiese et al. (2009) Germany (56)	Quantitative Prospective multicentre	To explore emergency physicians experiences in dealing with palliative care patients in out-of-hospital emergency situations and about their beliefs and interest in palliative care	Emergency physicians (n = 104)	Structured interviews out of a questionnaire	One-third of the EPs felt unskilled in emergency situations when caring for palliative patients. The therapy carried out during the emergency situations coincides well with the wishes of the palliative care patients (50%). Nearly 20 per cent of the EPs reported that they were able to keep their palliative care patient at home and avoiding hospitalisation	Medium	Low
Vilke et al. (2002) USA (52)	Quantitative Cross-sectional observational	To obtain medical follow-up and determine reasons why elderly patients access paramedics via 9-1-1 and then refuse transport	Patients (n = 100)	Structured interviews out of a questionnaire	The reasons for not being transported to the ED were as follows: the patient did not want to go to the hospital, they were concerned over the costs, the ambulance personnel implied no transport was needed and language barriers appeared during the assessment. The majority of patients were satisfied and confident with the care delivered by the paramedics	Medium	High
Wireklint Sundström et al. (2011) Sweden (22)	Qualitative	To describe and illuminate prehospital emergency care with particular emphasis on assessment	Paramedics (n = 6), RN (n = 3), Specialist ambulance nurses (n = 2)	Participant observation; field notes and individual interviews Lifeworld phenomenology	The carers' openness to the situation and to the patients' suffering and needs vary from being of minor interest to complete focus of the assessment. Assessments that focus solely on a patient's medical condition can be an obstacle to a full understanding of the individual and therefore the illness *per se*	High	High
Wireklint Sundström et al. (2012) Sweden (20)	Qualitative	To highlight prehospital care and how ambulance personnel prepare for their everyday caring assignments and avoid making premature decisions	Prehospital caring situations (n = 25), ambulance personnel (n = 11)	Participant observation; field notes and individual interviews Lifeworld phenomenology	The feeling of certainty and the unknown in a new situation, which means that the ambulance personnel are prepared at the same time as they are unprepared; in other words, they are prepared for the unprepared	High	High

Table 1 (Continued)

Authors First author (Year) Country (References)	*Research design*	*Aim and objectives*	*Sample*	*Data collection, key measurements*	*Major findings relevant to the review*	*Methodological and theoretical rigour*	*Data relevance*
Wireklint Sundström et al. (2013) Sweden (43)	Qualitative	To describe and analyse how caring assessment is learnt in the Specialist Nursing, Prehospital Care Programme for educating specialist ambulance nurses	Students, RN (n = 37)	Written data Themes of meaning Lifeworld phenomenology	The learning process of caring assessment consists of the following themes: 1. The learning process is challenged by care inadequacies; 2. The learning process goes through participation in caring; 3. The learning process is in close relationship with the patient; 4. The learning process is influenced by the unpredictable caring encounter; 5. The learning process relies on support from the supervisor	Medium	Low
Woodward et al. (2000) USA (49)	Quantitative Cross-sectional observational	To evaluate whether an increased level of parental involvement might benefit our patients, families and transport service	Accompanying parents (n = 46), Parents who did not accompany (n = 40)	Questionnaires	Twenty-five per cent of all respondent felt a parent should (4 or 5 on a 5-point scale) be allowed to travel with their child (37% Group Allow, 5% Group DoNot). Twenty-nine per cent felt that the parent should not (1 or 2 on scale) accompany their child (6% Group Allow, 67% Group DoNot), and 46% felt that sometimes parental accompaniment was appropriate (57% Group Allow, 27% Group DoNot). There does not appear to be a national consensus	Low	Low
Öberg et al. (2015) Sweden (48)	Qualitative	To gain an understanding of how EMS personnel perceive ambulance transport of children	Medical technicians (n = 3), RN (n = 4), Prehospital emergency nurses (n = 5)	Individual interviews Qualitative content analysis	Transporting children induces stress and is deemed a precarious task by EMS personnel mainly because children are considered more vulnerable than adults and because of the necessity to separate the child from the parent during transport. There is a conflict between medical and emotional well-being and traffic safety during the transportation of children and a fear of insufficient ability to care for the child. The EMS personnel's vulnerability is evident in the complicated care situation associated with transporting children in an ambulance	Medium	High

are associated with a total of 15 subthemes, which are indicated in italic text.

Caregiving in unpredictable situations

This theme illustrates the importance of a care relationship including what can be considered a caring relationship. However, it seems to be a great challenge to create trustworthy relations parallel to providing urgent or acute care.

Preparedness for responsibility. Being responsible for patient care was described as preparedness for the unknown and creating conditions for care and caring relations (19).1 Pre-information from the emergency medical dispatch (EMD) centre provided the ambulance professionals with basic expectations as to what they had to face on arrival at scene (20). Being open and responsive was essential in preparing and planning for nursing care (21) including recognition of the patient's lifeworld (22). The professionals found it impossible to be prepared for the unforeseen and meaningless (23).

The professional–patient relationship and lack of communication. Patients understood care as a circular process and interplay between themselves and the ambulance professionals (26). Patients needed to retain their identity through communicative contact and to recapitulate the elapsed time of the unexpected event (27). Patients emphasised the importance of effective communication within the professional–patient relation when treatment was urgent. Technical knowledge and relational skills together added up to professionalism (28). Patients' experiences of poor communication with one healthcare provider risked increasing subsequent use of other healthcare providers. Proactive behaviour by healthcare professionals made patients feel that their concerns were taken seriously (29).

Ambulance student nurses developed varying relationships depending on the patients' conditions and the environment (24). Balancing the demands of medicine and nursing care was essential (21) as was applying caring and medicine simultaneously (43). To be first responder on the scene of an accident appeared as a continuous movement between 'being' and 'doing', underlining the importance of being genuine in interpersonal encounters (25). Inadequate professional communication was found in pain management of patients affected by trauma (30).

Figure 2 The thematic map of findings.

Independent and shared decision-making

This theme illustrates how decision-making is tackled and perceived, mainly from the professionals' perspective and not from a holistic perspective. The paradox between independent decision-making and patient participation pervades all decision-making.

Challenges in assessment and referral. There are challenges for ambulance professionals associated with: (i) the assessment and triage of patients exposed to severe trauma (31) and/or epilepsy seizures (32); (ii) the referral of older people after falls (33); (iii) religious and spiritual needs (34); and (iv) differentiating frailty in older people (35). The extent of the challenges in emergency care situations was decisive for how decisions were made and demonstrated the challenges involved in getting to know individual patients (36, 37). Errors were also reported in assessment and decision-making concerning children (38). Administering analgesia sometimes resulted in errors since patients were not always honest when describing their pain (39). Informal decision-making predominated in the assessment and referral of older patients (33). External factors and the environment were also shown to influence decision-making (36, 37). Shared decision-making often occurred with older people after falls who expressed wishes either to remain at home or to be conveyed (33). When elderly patients were offered an alternative level of health care, they often chose a pathway to a community-based hospital (84). Patient choice could generally be trusted in patients with epilepsy since they often understood their condition and were competent to make an appropriate decision (32).

Learning and training to be professional. The assessment of severe trauma patients was perceived as a way of developing professional knowledge. More learning by practical skills training and feedback was needed (31), such as communication skills with dying patients and their families (40); nursing critically ill and injured children (41);

and pain management (42). Lack of training in paediatrics was found to be a problem (38). Patient encounters with patients in caregiving contexts constituted the most effective learning process for ambulance student nurses in order to develop understanding in caregiving assessment. Thus, this illustrates the importance of caring relationships with individual patients for the development of professional knowledge and skills (43).

Treatment and interventions. Pain treatment and management had been studied from the clinicians' perspective (30, 39, 42) and the patients' perspective (42). Refusal of treatment and inadequate analgesia dosages were common (42). Pain was commonly assessed using a verbal score, but professionals' views on severity were sometimes discordant with the patients' own pain ratings (30).

Paramedics' perceptions of their role in providing prehospital thrombolytic treatment were described as drivers for change. They also felt a professional and humanistic duty to provide care. The majority of paramedics considered themselves well placed to improve patient outcomes (44).

Public environment and patient safety

This theme illustrates the professionals' experiences of providing good and safe care to patients under conditions that are partly beyond their control. Good care is threatened by internal values and professionals' health is often threatened by the reality they face.

Ambulance professionals' exposure and stress. Ambulance professionals are often observed by other people and feel exposed to the expectations and pressures of the general public (32, 36), for example when lay people are present during adult cardiopulmonary resuscitation (CPR) (45, 46) and when the professionals refrain from resuscitation due to poor prognosis for survival (47). Strong feelings of identification with the victims are shown when ambulance professionals fail in caregiving or paying attention to the patient (23). Post-traumatic stress symptoms, guilt, shame and self-reproach are common after duty-related traumatic events (50).

Caring for children means increased anxiety for ambulance professionals (38) and induces stress (48). It is deemed a precarious task by EMS personnel mainly because children are considered more vulnerable than adults and because of a perceived necessity to separate children from parents during transport (49).

Safety and resources. Patient safety was specially emphasised when caring for children (38) and caring for patients at high speed (51). Safety for children in the ambulance services was limited (38, 41). Limitations in the care of children were the lack of appropriately sized equipment or standardised paediatric medication dosages (38). Safety was also compromised if emergencies arose during transport, due to professionals having to use their seat belts at all times and remain seated while caring for patients during transport (51). It was argued nonetheless that the inclusion of the patient perspective enabled safer decisions to be made and relieved suffering (22).

Ambulance professionals' attitudes and organisational culture. Nonclinical factors strongly affected ambulance personnel's diagnosis and treatment. The results showed considerable differences in the diagnosis and treatment of patients who could speak Swedish or English vs. those who could not (53). Also, language barriers between EMD centres and migrants created problems (54).

Professionals' attitudes towards self-harm were not influenced by the patient's age in general, although young patients were less adversely judged as their self-harm was seen as a symptom of distress (55). Attitudes to death and dying were similar regardless of the professional's gender, workplace, catchment area and type of formal care training. A large majority had difficulties in dealing with their own feelings or patients' feelings concerning death and dying (40).

Approximately half of the professionals felt comfortable providing emotional support after family presence during failed resuscitation (45). Concerning palliative care emergencies, prehospital emergency physicians expressed uncertainties in dealing with these situations (56). EMS culture also showed other results, for example blurring the line between good caring and collegiality (57) and not reporting errors made by fellow team members, due to fear of consequences (38).

Team, person-in-charge and the handover process. The team spirit among professionals helped novices to rely on colleagues in demanding situations (57). Command and control issues were acknowledged, such as clearly identifying the paramedic-in-charge or disagreements between same-level providers (38). The introduction of ambulance nurses is going to result in role differentiation between paramedics and ambulance nurses, with the risk of creating role conflicts. These are specially highlighted as a result of nurses' holistic perspective on older patients' needs (58). It was found that flight nurses had no or minimal involvement in triage as the responsibility for this was the responsibility of the medical officer (37).

The handover process in the chain of care was based on oral reports, handing over documented accounts and a final symbolic handover. Complicated care situations made the handover significantly more difficult compared to situations when patients had distinct medical problems (59).

Life-changing situations

This theme illustrates the fact that patients, family members, bystanders and professionals meet in situations that are sometimes of a life-changing character. Hence, these situations have strong existential implications for patient and family care.

Seeking care. A timely response was valued in terms of allaying anxiety quickly (60), otherwise spouses experienced an escalating spiral of worry (61) and patients feared sudden death (62, 63). In life-threatening situations, feelings of vulnerability and dependency were significant (62) and described as managing the challenges of responsibility and sense of aloneness (61, 64). Spouses managed situations when their partners suffered acute myocardial infarction by sharing experience, having knowledge, understanding severity, being rational and consulting others (65).

Two factors affected patient decision-making with regard to ambulance use: firstly, mistrust of the ambulance system, and secondly, the opinion that the local social and healthcare systems were inadequate (66). Patients did not want to go into hospital or they were concerned over the cost to themselves (52). Less than half of the parents wanted the transfer when their child was transferred to a community hospital (67).

Urgent need of assistance. Significantly higher self-rated perceived seriousness, urgency and pain were shown among ambulance users than for self-transports. Ambulance users were also more likely to agree that ambulance services are for everyone to use (68). Studies on the need for immediate assistance involve aspects of survival related to out-of-hospital cardiac arrests (OHCA) (69, 70) and to major incidents (71). Survivors expressed emotional needs and support needs (69, 70) and longing for compassion (71). Significant others' experiences of attending OHCA were described as feelings of unreality, characterised by an overwhelming sense of responsibility (72).

The ability of EMDs to instruct and help spouses to do what they could become evident in cardiac arrest events at home (73). To manage an event with acute myocardial infarction, patients described their need to understand it and to have a similar situation to compare with (74).

Suffering and relief of suffering. Patients suffering from cold exposure were studied in relation to low temperatures in the prehospital environment (75–77). In the ambulance, 85% of the patients had a finger temperature below comfort zone and 44% experienced the ambient temperature in the ambulance as cold (75). Receiving active heat therapy relieved patient suffering (78). Immobilisations to noninsulated or insulated spine boards showed a statistically significant increase in estimated shivering for subjects placed on noninsulated spine boards (79).

Pain management with transcutaneous electrical nerve stimulation (TENS) was a valuable and fast-acting pain treatment for post-traumatic hip pain (80) and music therapy made critically ill patients feel more comfortable (81). Oxygen reduced nausea and vomiting in patients with minor trauma and they were more satisfied with care when oxygen was administrated (82). Studies on elderly patients who were offered special care pathways show that they experienced the professionals as committed and thoughtful (83, 84).

Being cared for with good and bad feelings. Patients' experiences of care revealed good caregiving as well as bad (26, 83), positive and negative experiences (85), and potentials for satisfaction as well as dissatisfaction with care and outcomes (26). The relationship with ambulance professionals was understood as surrendering to dependence on another person (85). Consistently positive results were reported regarding patient satisfaction with care and treatment (86–90). Patients unacquainted with technical aspects of health care often made judgements based on satisfaction with perceived interpersonal care (91).

Ethics and values

This theme illustrates moral implications for professionals, based on ethical conflicts that must be handled in one way or another. The ways in which professionals handle ethical problems are crucial for the alleviation of patient and family suffering.

Ethical conflicts arose in relation to the professional–patient relationship, the patient's self-determination, the patient's best interest, professional ideals, the professional role and self-identity, significant others and bystanders, organisational structure and resource management, societal ideals, and other professionals (92). What constituted an ethical problem varied between professionals. However, agreement seemed to exist that there were many 'grey' areas, not clearly defined by law, where considerations about the patient's well-being came into conflict with protocol standards. Conflicts were also related to different norms among professionals (93).

Some of the conflict nodes identified (92) have been investigated and discussed in other studies (47, 94, 95). CPR has been discussed, exploring the arguments supporting and contradicting the use of futile CPR to benefit persons other than the patient (94, 95). Another ethical question was whether it is ethically correct not to resuscitate a patient in cardiac arrest if the patient is expected to survive for only a short time with a prognosis of very low quality of life (47, 77). Hence, providing care to patients suffering cardiac arrest appeared to be ethically demanding (77).

Ambulance professionals learned *ethical decision-making* and *practical reasoning* from peers and mentors. Professionals did not routinely use process-driven reasoning in decision-making. Instead, feelings of empathy were needed to reach an ethical decision (93). When confronting decisions on refraining from resuscitation, the majority of professionals relied heavily on the advice of medical experts while some made more autonomous decisions. Individual beliefs grounded in caring frameworks holding that it might be wrong to resuscitate sometimes conflicted with formal or informal guidelines based on the fundamental value of human life (47). A model of moral agency, combining adherence to ethical norms with the inclusion of virtue, was stated to be best suited to assisting professionals as they rendered care to patients (96).

Discussion

To our knowledge, this is the first integrative systematic review of caring science research in the context of ambulance services. One could argue that this review should result in an explicit description of the best evidence and conclusions to implement in the clinical setting. However, since the prehospital context is complex, the findings in this review can only indicate important fields of research and future directions for evidence-based caring.

Initially, a crucial discussion took place concerning the study design and the need of a broad search strategy. This strategy resulted in a large quantity of studies that were identified and screened for potential inclusion. However, given the wide aim and a 15-year inclusion period in this review, remarkably few studies were found eligible. Caring interventions were undertaken in only five out of 78 studies. This rather modest proportion of intervention studies may be explained by difficulties in getting informed consent from patients to participate in research in this unpredictable context and initial phase of urgent care. Another possible explanation may be the lack of empirical and theoretical research evidence for interventions.

By combining qualitative studies aiming at in-depth understanding of phenomena, with quantitative studies aiming at measuring and quantifying phenomena, the review shows similarities regarding the choice of phenomena studied, in spite of methodical differences. Such approaches could generate important knowledge in the future, if used in well-designed research projects. Overall, the findings may be seen as both an in-depth and broadened understanding of care provided by the ambulance services, which is usually described from a biomedical perspective.

Health – mostly connected to suffering and not to well-being

The main findings show research on illness and the suffering linked to it and how people strove to solve urgent or acute problems to obtain care as soon as possible. In life-changing situations, patients' and families' vulnerability and suffering are explicitly shown. Thus, health is primarily connected to suffering and not to well-being. These findings are in line with Eriksson (97) who argued that a basic concept in caring is the suffering that constitutes human beings' struggle between good and evil. This should be noted as a difference to the lifeworld-led perspective in caring science that emphasises health and well-being rather than suffering as the starting point for caring. Thus, the general aim of caring was to support and strengthen individuals' health processes despite illness and injury (98). Regardless of whether the starting point in caring is well-being or suffering, the patient's exposure and lack of power are important considerations since caring has the purpose of alleviating human suffering and promoting the patient's health (7).

The findings show the dominance of acute illness and life-threatening conditions as in EMS studies with a predominantly biomedical perspective. Nevertheless, studies having a clearly defined existential dimension were also found, for example focusing on patients' religious needs; relieving patients' anxiety by taking their concerns seriously; and reducing anxiety with music therapy. These approaches underline the fact that the patient's physical, psychological, existential and spiritual dimensions form a unity (7). They constitute a growing field of caring research and future possibilities to promote evidence-based caring practice in prehospital emergency care. In this case, lifeworld-led care strives to articulate the meanings of health, illness, suffering and well-being (9). Since lifeworld-led health care is grounded in caring science knowledge, we argue that this approach is better than patient-led care. One essential aspect in such a belief is that all kinds of reductionist views on patients and their conditions are contradictory to what it means to be a unique human being. Professionals handling their power in a judicious manner must thus respond both to the patient's vulnerability and autonomy when they are practising lifeworld-led health care.

Aspects and different views on health related to comfort and discomfort are shown, from which we may conclude that comfort is a broader holistic concept compared to well-being (99). Health is also related to satisfaction and mostly positive results were reported regarding patients' experiences of satisfaction, for example related to staff attentiveness and gentleness and nurses taking time to meet patients' needs. We may, however, question how these studies reflect a caring perspective since they use surveys that can only mirror general opinions based on predefined statements about care, not nuances of how human beings feel about their health. Individual perceptions of satisfaction are probably better related to the concept of quality of life (99). This criticism is in line with Gill and White (100) who advocate a theoretical or

conceptual development of the notion of patient satisfaction to avoid low reliability and uncertain validity.

Caring – professionals striving for openness and sensitivity in unpredictable relations

Caring is unpredictable in the ambulance service, on account of the necessity to maintain openness to the unknown. Preparedness and responsibility are also required in caring encounters with individual patients. Such encounters highlight how essential the professional–patient relation and communication are. Openness and unpredictability are specific factors in care provided by the ambulance services. It seems nevertheless that the findings regarding the professional–patient relation conform to Dahlberg's et al. (9) notion of lifeworld-led health care. Among other things, this approach ensures that people in the care of the health service feel valued and are treated with respect, dignity and compassion. However, the question arises whether – and if so how – unpredictability affects the caring encounter in prehospital emergency care, that is whether this encounter challenges professionals to show sensitivity and compassion.

The ability to show compassion tends to be lacking, and caring was experienced mostly as 'transportation'. If providing compassionate care is a problem for professionals and if the lack of compassionate care is a problem for patients, then this must be seen as an 'awakening' and must be further highlighted and explored. Both older people and children are seen as special groups of patients associated with challenges in relation to unilaterally understanding the need for urgent and acute medical treatment. The Nordic tradition in caring science shows that professionals are more likely to recognise their patients' unspoken needs and discover existential concerns through acuity of the senses, self-awareness and knowledge-based development (7). However, it is possible that some professionals overvalue their ability to be sensitive and so ignore the patient's lifeworld, since they do not fully understand the importance of a mutual relationship and also of acting on the basis of the patient's perspective.

Environment – a stressful and uncertain place for care

The prehospital environment has been shown to have a crucial impact on caring. External factors and uncertainty in the environment influence independent and shared decision-making in a negative way. Independent decision-making is a typical aspect of the professional's role in the ambulance services, with unique autonomy in their assessment and triage. However, the question arises in what way environmental aspects such as uncertainty and stress influence the patient encounter, especially in public environments. Uncertainty in the environment may affect the caring encounter, and an assumption is that the patient's well-being and satisfaction will be affected if and when the patient wants to influence the decisions taken. Harenčárová (101) found that the most common type of uncertainty among ambulance personnel was inadequate understanding of the situation and that reduction was the strategy most used to manage uncertainty. Due to the environment, the decision-making processes may take longer due to incomplete information and undifferentiated care alternatives.

Ethical patient perspectives – based on empirical ethics

Research on ethics in this review deals with the identification of ethical problems, analysis of the professionals' ways of solving ethical problems, and ethical conflicts and decision-making in connection with life and death situations. The studies are based primarily on normative ethics, virtue ethics and proximity ethics. Other studies describe different forms of relational ethics and an ethical patient perspective without the researchers clarifying the connections to ethical theories. Consequently, we find quite some breadth in ethical approaches when studying ethical problems in the context of the ambulance services. Also, there is little empirical research based on the patient's perspective as a starting point for discussing ethical issues and analysing the ethical conflicts that follow from the professionals' approach.

Knowledge gaps in caring science

To be able to conduct studies on caring interventions directed at patients, families and healthcare professionals, we need to understand lifeworld-led care better, as well as how it can be achieved in prehospital emergency care. Furthermore, caring in the ambulance services has been sparingly investigated. With more research on the role of ambulance management in lifeworld-led care, for example the development of a holistic approach by staff leaders, possibilities and obstacles may be visualised. Additionally, such knowledge should not be seen as time-consuming; instead, it is supposed to benefit effectiveness in the healthcare system.

Strengths and limitations

The theoretical framework that constitutes the focus for this review strengthens the validity of the study as it delimits the focus to one single definition of caring science, even though that definition is wide. The theoretical framework selected has been consciously chosen because it can shed light on a holistic approach to patients in a healthcare context dominated by emergency medicine, traumatology and disaster medicine. Since the research studies included are based on the perspectives of relatives and professionals, there is an explicit connection to the patient's perspective and the patient's situation.

Both strengths and weaknesses concern the authors' investigation into their own research context. It may be considered a strength that the authors have the theoretical and clinical knowledge to value, understand and interpret the research included. However, this is also a potential limitation as a close relationship to the study research area also involves risks in handling their own preunderstanding, which may constitute a barrier to openness. In order to promote objectivity and a critical approach (102), the authors participated in a number of discussions during the whole research process to be aware of any mistakes regarding the selection process, data analysis and interpretation of the results.

The broad aim and search strategy are further limitations. With a narrower research question, it would have been possible to answer more specifically what the best evidence is in a specific care situation, based on one specific concept in caring science. However, this was not the ambition for this review; instead, our intention has been to create an overall picture of a wider field of research to identify its scope and content, and present knowledge gaps. Therefore, the findings in this review may be understood as a mapping of the studies included rather than a full in-depth investigation of a clearly defined phenomenon. In retrospect, however, we may note that the majority of studies included could hardly have been the basis for any review of a more clearly defined phenomenon. The reason is simply that there are not enough research studies in the ambulance services context focusing on the same phenomenon, that is only limited and superficial research results are available. Nevertheless, we may assume that this field of research has expanded since 2015.

Perhaps it may be considered a limitation that more than half of the studies were conducted in Sweden. This is probably a reflection of differences in the EMS systems around the world, that is the caring science approach is mainly used in countries where RNs have an academic tradition of clinical and theoretical research work in the ambulance services.

Despite the use of an experienced librarian in the search for literature, the possibility exists that our search methodology, inclusion and exclusion criteria did not capture all relevant studies. In addition, publications may already have been missed in the first screening process, for example if the title did not include the patient perspective.

Conclusions

Caring science research in the ambulance services is limited when it comes to research with a clearly declared patient perspective and hence represents an undeveloped field of research. This premature research situation can be seen as a parallel process to introducing RNs into the ambulance services and adopting an academic tradition of clinical and theoretical research. This new research area needs to be explored for its possibilities and its limits before starting up intervention research to any greater extent. However, the findings provide important directions to guide future empirical studies on ways to capture and promote caring science research in prehospital emergency care.

Specific areas of particular interest in future research have been shown to be the impact of unpredictable encounters on openness and sensitivity in the professional–patient relation, with special focus on value conflicts in emergency caregiving situations.

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Conflict of interest

The authors declare that they have no competing interest.

Author contributions

All four authors carried out this review and the work has been distributed equally regarding study conception and design, analysis and interpretation of findings. All authors approved the final manuscript. Birgitta Wireklint Sundström coordinated the research group.

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1. This number refers to the study presented in Table 1.

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