Concept analysis of emergency pre-hospital burn care: a hybrid model

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Abstract

Pre-hospital care as a concept is subjective, multidimensional, ambiguous and associated with the health care system. Throughout the world the focus has been on the importance of burn victims, and pre-hospital emergency care is still an abstract concept. The purpose of the present study was to analyze the concept of care in the context of pre-hospital emergency. The study employed the hybrid model to define the concept of pre-hospital care through three phases including theoretical phase, field work stage, and overall analysis. According to the results, six major themes emerging for pre-hospital care included first contact care, assessing patients' needs, sense of security, evidence-based, coordination and vehicle. The results of this study will help clarify the concept of pre-hospital emergency care. This clarification can lead to offering comprehensive medical services based on patient needs and developing the nursing profession. Also, identification of facilitators or barriers and the concept of pre-hospital emergency care will help the nursing administrators and educators to be able to design managerial and educational activities based on scientific findings to execute the necessary conditions for learning and implementing high quality pre-hospital emergency care in nursing.

Keywords: Burns, Concept analysis, Prehospital care.

Introduction

The ambiguity of some basic principles and elements of nursing indicates that nursing is facing significant barriers to its progress in knowledge and functioning. Clarifying those elements does not merely mean defining and explaining them, but creating a common language and enhancing nursing functioning [1,2]. Providing pre-hospital emergency care for patients, as one of the emergency care elements, is vital [3]. However, pre-hospital emergency care like many other concepts of nursing has engaged nursing experts' minds for a long time. The phrase pre-hospital emergency care does not convey the same meaning under different circumstances and is associated with challenges [4]. Pre-hospital emergency care is the first link in the chain of survival in the healthcare system for trauma patients and it can serve as a determinant factor in gaining results. The development of pre-hospital emergency care has resulted in the advancement of nursing [5]. Research in this field has rapidly grown in recent years in order to clarify the meaning of pre-hospital emergency care and to compare differences in its perception by nurses and patients [3,6]. However, pre-hospital emergency care is still considered as a different and unperceived concept in the field of nursing. Pre-hospital emergency care is sometimes defined as the care that begins from the scene and ends at the emergency room of the hospital. Some studies say pre-hospital emergency care continues up to the time when the patient is discharged from the hospital [7]. Sometimes, pre-hospital emergency care means triaging injured patients. It is also defined as fixing and examining the injured on the scene of the accident [8]. Meanwhile, pre-hospital emergency care can refer to services provided by paramedics. Some people also define pre-hospital emergency care or on-the-scene management of the accident as the management

of trauma and incidents on the spot. In this sense, pre-hospital emergency care forms a major part of first aids [9]. Pre-hospital emergency care is also regarded as something that links pre-hospital care to hospital care [10]. Goksin defines pre-hospital emergency care as primary examination and management of injured by professional healthcare providers, which reduces the death rate [11]. William Rush believes that the emergency medical services system is a combination of communication mechanisms used to initiate responding the patient, the vehicle along with personnel for providing healthcare services and transferring the patient, and a center for admission of the patient [12]. A large number of deaths particularly in developing countries occur at pre-hospital units. A study in Iran shows that pre-hospital death rate stands at 42% [13]. For this reason, paying attention to pre-hospital emergency care has become necessary more than ever in Iran. That is because pre-hospital emergency care is a vital part of the healthcare system and is considered as a public service in most societies [14]. Khorram Nia *et al*. believe that pre-hospital emergency care involves services that begin beside the patient bedside and end in hospital [15]. Bidari *et al*. state that pre-hospital emergency system is the first unit that caters to the injured and assumes the vital role of providing first aids for the patients [16].Burn patients are the main group of patients that need pre-hospital emergency care. Burns are the second cause of death after road accidents [17]. Burn patients mostly receive pre-hospital emergency care rather than medication [18]. According to Vetta-Hall, emergency pre-hospital care of burn patient means services offered outside the burn care center. Such healthcare services considerably affect the long-term outcomes for the injured [19,20]. According to Deboer, the pre-hospital emergency care of burn patients includes examination of the airway, respiration, blood circulation and transferring the patient to the hospital [21]. Shrivastava believes that initial interventions involve those taken immediately after the burn and they have a major impact on the width and depth of the injury [9]. Apart from the above definitions, Hunyadi found that in most accidents, ambulances and paramedics are only used for transferring the patient to healthcare centers and no treatment measures are taken before the patient arrives at the healthcare center [22]. While many studies have been conducted on the issue, there is no consensus on what is called pre-hospital emergency care, particularly pre-hospital emergency care of burn patients. In fact, ambiguity in the meaning of the concept can lead to its improper use in nursing. Analysis of meaning is a valuable method for clarifying widely used and ambiguous concepts in nursing. The analysis of concept aims to determine and search for the features of that concept for clarifying its nature and meaning with regard to nursing [23]. Pre-hospital care in Iran should be defined according to the country's culture and there should be a framework for supporting its infrastructures based on health. That is because each country uses its own approach to respond to patients and relieve their problems as well as to assess, treat and transfer the trauma patients [24]. Regarding the significance of pre-hospital emergency care for burn [25] and urgent need of burn patients for pre-hospital emergency care [26] as well as the ambiguity of the pre-hospital care as a concept, researchers have sought to analyze emergency pre-hospital care of burn patients as one of main elements in nursing care. They aimed to know what emergency pre-hospital care of burn patients means within Iran's culture and society.

Method

Analysis of concept: Hybrid model was used for analyzing the concept of pre-hospital emergency care in this study. The hybrid model is a method for conceptualizing, completion of concept and development of theory. The model is used in general and specialized nursing and for removing abstract concepts and ambiguities of nursing. [27] It consists of three stages: theoretical, fieldwork [interviewing, observation, etc.) and final analysis [28]. For the completion of the concept, the hybrid model uses an approach that combines theoretical and empirical studies. The development of the concept by using the hybrid model combines the deductive and inductive analysis methods so that widely-used concepts will be refined. In this study, we used the same approach to analyze the concept of pre-hospital emergency care.

In the literature review phase, all available databases like Medline, Elsevier, Science Direct, ISI Web of Knowledge as well as Persian databases like SID, IranMedex and Magi ran were searched with key words: pre-hospital, initial management, ambulatory and burn, burning, first aid and their Persian equivalents. All the scientific papers were published until September 2012 were assessed. We found a total of 676 papers. At this stage, the titles and abstracts of the papers were assessed using the Strobe checklist. Then, irrelevant papers or the ones that solely focused on medical intervention were excluded from review of the study. Finally 81 papers were included in the research. The complete text of final papers was retrieved using online sources and journals as well as, if necessary, through contact with their authors.

Schwartz and Kim believe that in the hybrid model, 3 to 6 people are suitable for an analysis at the individual level [23]. The participants in the present study were selected from burn patients, nurses and physicians of burn ward from Imam Reza Hospital and the emergency unit 115 of Mashhad. The data were collected from June to July of 2012. The data were analyzed using the qualitative content method on an inductive basis at the same time when they were being collected. This method is used particularly when research literature on a phenomenon is limited. The analysis of the data began with frequent reading and immersion in them and acquiring a general perception. Then, the text was read word by word until the codes were be extracted. In the next stage, the codes were categorized and their relationship was determined. The categories were meant for meaning clusters. Based on the relationships between the sub-categories, some of the data were organized in new groups and their relationships were shown in order to develop and reorganize the data in the form of a schematic tree based on hierarchical structure [29]. Throughout the study, special methods were used to ensure the reliability and validity of the research. The long-term contact of the researcher with the locations of research, related authorities and participants helped win the trust of the participants and also helped the author better understand the research field. The participants were re-evaluated to ensure the credibility of the extracted data and codes. Some interviews, codes and categories were assessed by two nursing researchers in addition to the author to ensure the re-evaluation by observers. There was a 90% consensus over the results of the study. Meanwhile, the findings were discussed with some nurses who did not participate in the study and they confirmed that the findings were appropriate. The study observed confidentiality and respected the freedom of the participants to take part in or leave the research. The participants consented to the recording of the interviews and also had the right to leave the study whenever they desired. Before collecting the data, hospital authorities and participants officially agreed to take part in the study.

Results

At the theoretical stage, related studies were reviewed and an operational definition of the concept was given for assessing the nature of the existing knowledge about the phenomenon. First, the features of the concept were collected from different databases and sources and are introduced as below:

Features: “Competence”, “being evidence-based”, “care on first contact”, “meeting patient's needs”, “coordination”, “feeling safe”, “knowledge, skill, experience” were the main features of pre-hospital emergency care. The first feature was having the competence to provide pre-hospital emergency care. Competence means the behaviors based on performance ability and safe outcome according to standards in real situation [30,33]. According to Bagheri study, competence is an effective factor in ensuring the quality of healthcare services and patients’ satisfaction [34]. The second feature was meeting patient's needs. Emphasis on the patient-oriented nature of care and on enhancement of the quality has caused the healthcare providers to pay more attention to the patient, his needs and values [35]. Nurses should be able to find out the needs and restrictions of patients [36]. The third feature is evidence-based care. This is very important because people are undeniably entitled to receive first aids properly acquired through sound scientific evidence with clear explanations [37]. The fourth feature is

first–contact care. The pre-hospital emergency care begins immediately after the accident and continues until the patient is transferred to a medical center [38]. The fifth feature is coordination. Pitt believes that people involved in creating and developing pre-hospital emergency care make this process possible through coordinating existing resources and equipment and experiences gained during international courses for upgrading the general standards of pre-hospital emergency care [39]. The sixth feature is security feeling. According to Gary and walker, patients who feel secure during their contact with the pre-hospital emergency unit will have higher levels of satisfaction [40]. The seventh feature is knowledge. Wireclint-Sandstrom stated also that the knowledge of pre-hospital emergency care is clear, transparent and undeniable [41]. Prerequisites of pre-hospital emergency care are organizational factors (material and human resources), nursing factors (nursing theory, models or theory of care like the King theory) and factors related to the type of care (comprehensive, coordinated and effective).

The outcomes of pre-hospital emergency care include coordinated services, pain management, control of symptoms, proper transfer of the patient from the accident scene to specialized hospital and reducing the stress of burn patients. A review of all the literature shows that the operational definition of pre-hospital emergency care is that providing healthcare at the pre-hospital emergency unit should be coordinated, managed and based on evidence as well as knowledge, skill and experience. Psychological and mental support should also be given to the patient on his first contact with the healthcare center.

The present study used purposive sampling and empirical data were collected through semi-structured interview. Pre-hospital emergency care is an interactive phenomenon between healthcare provider team and the burn patient. Meanwhile, educational system plays a key role in training workforce. Therefore, we interviewed with 4 nursing instructors (mean experience of 12 years), 4 burn center nurses (mean experience of 9 years), 4 personnel of the Emergency Unit of 115 in Mashhad (mean experience of 7 years), specialist doctor (mean experience of 14 years) and 5 burn patients and their relatives. The interviews lasted for 30 minutes on average and were based on interaction between interviewer and interviewee.

The interview with the Emergency Unit 115 of Mashhad personnel began with a general and simple question like "How many years have you been working at the pre-hospital emergency unit?" Then, they were asked to explain an occasion on which they provided healthcare services for a burn patient recently before taking him to the hospital. Then came more specialized questions like how to choose the type of care, how to provide healthcare on the accident scene, the characteristic and role of healthcare providers at the pre-hospital emergency unit and related factors.

The interview with the nurses of burn emergency unit also began with the general question "How many years have you been working at the pre-hospital emergency unit?" Then, they were asked to explain the experience of their recent occasion on which they provided healthcare services for a burn patient transferred to the emergency unit by ambulance and the Emergency Unit 115 of Mashhad personnel. Then came more specialized questions like "How do you assess the emergency pre-hospital care of burn patients provided by the personnel of the unit 115 of Mashhad?" and "What are the effective factors related to the manner of providing pre-hospital emergency care of burn by the unit 115 of Mashhad?"

The interview with the injured and their relatives consisted of such questions as "How do you or your patient assess the pre-hospital emergency services?" and "What was the role of the ambulance and its team for you after the burn accident?" The questions for instructors were: "What do you do for training good nurses for working in pre-hospital emergency?", "What qualifications should they have?" and "What are the barriers to and facilitators in training them?"

The interviews were written down and recorded with the consent of the participants. The final sample size was determined based on data saturation. The study of the data shows that some of the features acquired in the field or at the theoretical level are compatible with each other like:

The first – contact care:

Today, the first – contact care of the critical

patients with healthcare system is occurred at the pre-hospital emergency. The more properly and more accurately or swiftly the pre-hospital emergency care is done, the less the mortality rate and the more people's trust in the system is.

Participant 3: "…Once the ambulance arrived, the 115 unit personnel provided treatment for my son immediately; they washed and bandaged the burn area and placed the IV line. In the ambulance also, they constantly monitored my son until they reached the hospital…."

It is vital to begin taking healthcare and treatment measures immediately after the accident. Examination, diagnosis and treatment of life-threatening injuries during the early hours after the burning have a significant impact on the long-term outcomes for the injured.

Vehicle for transportation of the injured:

The paramedics are the emergency care providers immediately after the accident and most initial healthcare are provided outside the burn centers.

Participant 5:"…After explosion of the water heater, I dialed 115 because I had no vehicle. Only an ambulance could take my wife to the hospital. I repeatedly requested them not to waste the time and to quickly take her to the ambulance so we would get to the hospital on time…."

Pre-hospital emergency care for burn patients means initial assessment and management of the injured by the healthcare and treatment personnel. This decreases the mortality rate of patients and the patients need emergency care rather than medication during the first few hours after the accident.

Evidence-based care:

National guidelines based on scientific evidence are necessary for standard care by the emergency pre-hospital unit.

Participant 2: "… It is more appropriate that pre-hospital emergency care is supported by scientific evidence as professional caregivers can boost the quality of emergency services by using the results of studies…."

In the review literature, there is more emphasis on emergency care based on scientific evidence. In the field, the emphasis on evidence-based care was also observed.

Meeting patients' needs:

Determining the care concept for pre-hospital care providers and providing the emergency services based on patients' needs lead to the better quality services.

Participant 7: "….when we are dispatched to the accident scene, our guidelines are not the same for all people. We need to examine the special circumstances of each patient and based on the patient need and his situation, we perform emergency measures."

The ability of emergency team in pre-hospital care is to find out the needs and restrictions of patients. Matching between the patient expectations and interpretation of the emergency team about these expectations is the main point of providing appropriate care.

Coordinated care:

Coordination at all levels of pre-hospital emergency care is the successful key to providing quality services.

Participant 6: "….emergency pre-hospital care organizations and providers should offer services according to international and coordinated standards in the shortest time."

If different parts of the pre-hospital emergency unit are coordinated, the ambulance will be dispatched in time and the possibility of death and disability will be reduced.

Competence: The dynamic and variable nature of the pre-hospital emergency unit and the unstable circumstances of help-seekers needs for efficient decision-makers, so they will be able to make sound judgments about the health status of patients by combining their technical skills and professional knowledge.

Participant 11: "…. when pre-hospital emergency care providers can make the best decision based on their knowledge, experience and skills and take the appropriate measures for injured based on standard criteria will have the necessary competence for this purpose…."

The close relationship between clinical competence and the meaning of care quality has caused clinical competence to have a unique place as a practical discipline in nursing.

Right attitude: One should consider the moral, spiritual, and cultural aspects, values, and beliefs of the patient in order to provide comprehensive care.

Participant 15: "…when we are dispatched to the accident scene, we will try to solve the problems as a team while respecting the values and beliefs of the injured according to our

limited time frame and facilities; we make our best to provide the full psychological and physical support…."

Nejsemis quotes Banner that the process of creating efficiency is the combination of knowledge, skill, attitude and values.

Feeling secure: One of the professional features of the pre-hospital emergency care unit is the ability to give a sense of security to the injured. This is achieved through properly providing services.

Participant 17: "Upon arriving on the accident scene, we will support the patient psychologically and will try to give a sense of security and safety to him and his entourage by composure and control in cares and clinical measures…."

The pre-hospital emergency unit initially assesses the patient based on a set of immediate information while they keep calm and composed. Then they give him a sense of security and win his trust by properly providing healthcare services.

Discussion

Pre-hospital emergency care is the first link in the chain of survival in the healthcare system for trauma patients and it can serve as a decisive factor in determining outcomes [6]. The present study aimed to clarify the meaning of pre-hospital emergency care of burn patients. Finally, it provides a general definition of nursing after a review of other studies. During the fieldwork and the analysis of findings, 6 themes were extracted from the interviews for pre-hospital emergency care. They include: first-contact care, meeting the patients' needs, security, evidence-based care, coordinated care and vehicle for transportation. As for the first-contact care, participants (nurses and personnel of Emergency Unit 115) said that the patients should be given healthcare after their first encounter, that is, the place where the patient is. That is because we lose considerable time if we transfer the patient to the hospital. In fact, first-contact care indicates the overall model of general healthcare received by the patient in their first encounter with the healthcare services team. The model consists of all stages from examination to diagnosis and choosing the best treatment method and then making a decision as to discharging or referring the patient. Therefore, all the services received by the patients in their first encounter with the healthcare team are called first-contact care [42].

The other important theme in this study is evidence-based care. People are definitely entitled to have access to well-explained first aid acquired through sound scientific evidence [43]. The 2006 report of the medication clinic refers to the shortage of evidence-based care at pre-hospital emergency units and describes the necessity of high-quality research on pre-hospital emergency care [44].

Another significant theme is coordination, which has a special place in this study. In this regard, Armstrong said that access to coordination in individual-oriented care for people with complicated needs for healthcare is multi-dimensional. Hence, it is highly unlikely that all known components of coordinated care at all levels and in every field are available. It is important that healthcare organizations and providers identify unknown components of coordinated care that are not available and specify the reason for such absence. Therefore, it is appropriate that the injured people receive complex coordinated care with regard to the identification of the missing components be supported and they will participate in the process of determining the cause and results of this absence [45].

The empirical data from the interviews of participants refer to giving a sense of security and reducing stress and its positive effect on the medical outcomes of burn patients. Pertoft-Larsen *et al*. stated that giving a sense of security to the patient is one of the important professional factors in dealing with the patient at the pre-hospital emergency unit [46]. The ability of healthcare providers to give burn patients safe services at the pre-hospital emergency unit plays a key role during the initial interaction with the patients and it increases their trust in the healthcare relationship. Patients may experience less stress if healthcare providers can provide them with security. This can have a positive effect on the outcomes of the treatment. The empirical data from interviews with the burn patients and their relatives show that they did not consider ambulance and Emergency Unit 115 as a healthcare center. They regarded calling for an ambulance as a way to reach the hospital

provided that they could not go to the hospital by themselves. Therefore, there was no direct relationship between their imagination about pre-hospital care and what actually happened in the ambulance. It appears that patients have low expectations of ambulance services and pre-hospital emergency healthcare providers. They only expect it to transfer them to the hospital although emergency healthcare providers have sophisticated equipment for treatment on the accident scene and they perform proper measures to examine the patient [3]. According to Vetta-Hall and *et al.* report, the quality of care during the early hours after burning has a key impact on the long-term outcomes of the patient and most initial services are given outside the burn care center. Therefore, all the personnel who provide healthcare services at the pre-hospital emergency units should be ready to provide care for patients [20]. Reviewing these studies show that initial healthcare services on the patients by pre-hospital emergency care providers has a positive impact on the mortality rate and prognosis of patients [11]. Barnet *et al.* believe that pre-hospital emergency care means services that respond to the health need of people outside hospitals. The need includes paying attention to life-threatening incidents and transferring patients and injured people to the hospitals for examination and treatment [47]. Attending to general information about another feature of pre-hospital emergency care, that is, transportation vehicle makes patients and their relatives aware of the issue that contacting the emergency unit and calling for an ambulance meant requesting advanced healthcare services. In the empirical data from interviews, participants described experience and theoretical knowledge as an important factor in boosting clinical competence and providing services at the pre-hospital emergency unit. They also said opportunities provided in pre-hospital environments paves the way for acquiring competence. Ability to apply knowledge, perception and skillful performance are standard factors for employing healthcare providers. Meanwhile, acquiring competence requires a set of defined basic knowledge, psychomotor skills and behavioral characteristics. Creating a competency-based framework, which is applicable in the pre-hospital emergency unit, is urgent need for professional progress [48]. In a study titled "Group Monitoring: A tool for Developing Professional Competence in Pre-hospital Care", Brink and Sernet stated that the need for competence and skill among Emergency Unit 115 is gradually increasing and their work should be evaluated from different perspectives [46]. As to the main emerging themes in relation to the main features of nurses providing pre-hospital care, we can say that they need to acquire knowledge, skill, experience, competence and right attitude [49]. Caroline *et al.* stated that pre-hospital healthcare providers should have the knowledge and skills necessary in different emergency situations [3]. Continuing medical education (CME) is the most common method used for upgrading the knowledge and skill of healthcare personnel. Therefore, CME is the most probable way through which they can be enhanced and it is the most important tool for acquiring competence and development by the healthcare personnel [20].

On experience, Suserud said that the basis of pre-hospital care based on the experiential knowledge is flexibility and humbleness of the healthcare providers when they face the patient [42].

Regarding the right attitude, one should consider the fieldwork and similar literature. Attitude is related to cultural, ethical and spiritual aspects as well as personal values and beliefs. Finally, it leads to a holistic view to human [13,50].

We can conclude based on the results of this research that the definition, circumstances and outcomes of healthcare as well as the characteristics of care providing nurses were determined. The results of the study can be used for clarifying the meaning of pre-hospital emergency care within the healthcare system. The views of nursing experts and the results of other studies can be used for removing obstacles from providing the emergency pre-hospital care to burn patients.

Conclusion

The present study has defined a field on which few researches have been conducted. In other words, the study defined pre-hospital emergency care features of burn patients and

laid the groundwork for applying the concept. The study gives an in-depth insight into pre-hospital emergency care of burn patients and related factors could be effective on their outcomes. However, much work remains to be done to clarify the details of this concept within the social and cultural context of pre-hospital emergency field in Iran and as long as knowledge and experience are available, further development of the concept is a need.

Contributions

Study design: RF, HK, FM
Data collection and analysis: RF
Manuscript preparation: RF, HK, FM

Conflict of interest

"The authors declare that they have no competing interests."

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