การดูแลผู้บาดเจ็บฉุกเฉินในระยะก่อนถึงโรงพยาบาล ในห้องฉุกเฉิน และการส่งต่อระหว่างโรงพยาบาล: การทบทวนวรรณกรรม

TRAUMA CAREINPREHOSPITAL, EMERGENCY DEPARTMENT, AND INTER-FACILITY TRANSFER: A LITERATURE REVIEW

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บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่อวิเคราะห์คุณภาพการดูแลผู้บาดเจ็บฉุกเฉินก่อนถึงโรงพยาบาล การดูแลในระยะฉุกเฉินในโรงพยาบาล และการส่งต่อระหว่างโรงพยาบาลในบริบทประเทศไทย ได้หลักฐานเชิงประจักษ์ จำนวน 37 เรื่อง แบ่งเป็นหลักฐานเชิงประจักษ์ในการดูแลผู้บาดเจ็บฉุกเฉินในระยะก่อนถึงโรงพยาบาล จำนวน 9 เรื่อง การดูแลในห้องฉุกเฉิน จำนวน 19 เรื่อง และระยะการส่งต่อระหว่างโรงพยาบาล จำนวน 9 เรื่อง ผลการศึกษาพบว่า บริบทและสภาพแวดล้อมที่มีผลต่อคุณภาพการดูแลผู้บาดเจ็บฉุกเฉินในระยะก่อนถึงโรงพยาบาล การดูแลในห้องฉุกเฉิน และการส่งต่อระหว่างโรงพยาบาล ประกอบด้วยจำนวนบุคคลากรในชุดปฏิบัติการช่วยเหลือ ระยะทางจากโรงพยาบาลถึงจุดเกิดเหตุ การร่วมมือกันของชุมชน ปัจจัยนำเข้าที่มีผลต่อคุณภาพการดูแลผู้บาดเจ็บฉุกเฉิน ได้แก่ ความรู้และทักษะของผู้ช่วยเหลือ ณ จุดเกิดเหตุ ห้องฉุกเฉิน หรือระหว่างส่งต่อ ระยะเวลาที่ผู้บาดเจ็บฉุกเฉินได้รับการช่วยเหลือ ณ จุดเกิดเหตุ ระยะเวลานำส่งผู้บาดเจ็บฉุกเฉินจากจุดเกิดเหตุถึงโรงพยาบาล จำนวนเจ้าหน้าที่ ความพร้อมและความเพียงพอของอุปกรณ์สื่อสาร ความพร้อมและความเพียงพอของอุปกรณ์ที่ให้การช่วยเหลือ กระบวนการการดูแล ประกอบด้วยระบบการประสานงานระหว่างผู้ส่งต่อและผู้รับผู้บาดเจ็บฉุกเฉิน การมีแนวปฏิบัติหรือมาตรฐานที่ชัดเจน ใช้ง่าย สมรรถนะการตัดสินใจของผู้ให้การช่วยเหลือ การสนับสนุนและนโยบายของหน่วยงาน และผลลัพธ์การดูแล ได้แก่ อัตราตาย ระยะเวลาในการนำส่งผู้บาดเจ็บฉุกเฉิน ความปวด ความสามารถเชิงสมรรถนะของพยาบาล ความพึงพอใจของผู้ให้การช่วยเหลือ ผู้ป่วยและญาติ ผลการศึกษานี้สามารถนำไปเป็นข้อมูลพื้นฐานในการพัฒนาคุณภาพการดูแลผู้บาดเจ็บฉุกเฉินต่อไป

คำสำคัญ: ระยะก่อนถึงโรงพยาบาล ห้องฉุกเฉิน การส่งต่อ

Abstract

This study aimed to analyze the quality of trauma care in Thailand at the prehospital, emergency department, and inter-facility transfer settings. Total of 37 articles were reviewed, which composed of 9 studies in prehospital settings, 19 studies in emergency department, and 9 studies in inter-facility transfer settings. The findings showed that contexts related to trauma care in prehospital, emergency department, and inter-facility transfer settings were associated with numbers of rescuers, distance to scene on time to dispatch center, and corporation of community. Inputs to improve quality of care were divided into knowledge, rescuers' skills, communication skills, and decision-making ability of the rescuers at the scene, emergency department, and inter-facility patient transfer. In addition, an adequate quality of the equipment was other input related to factors. Process of care included communication skills between the senders and recipients, possessing knowledge, experience, skills of the rescuers, available clinical practice guideline, decision-making ability of the rescuers, and organization supporting policy. Outcome indicators include mortality rate, rescue time at a scene and at an emergency department, transportation time, competencies of rescuers, satisfaction and information needs of patients and caregivers. The findings of this review can be used in proposal for policies to improve the quality of prehospital, emergency department, and inter-facility transfer care in Thailand.

Keywords: prehospital, emergency department, inter-facility transfer care

Introduction

Survival rate of patients with traffic injuries depend on effective care obtained during prehospital, emergency, and inter-facility transfer care. Evidence showed that approximately 60 - 80% of patients died at the scene or during prehospital phase. One survey study in Thailand found that 6,000 out of 4,000,000 traffic injured patients died during prehospital phase (Patthanapreechawong et al., 2012). The quality of care that the injured patients received from scene to emergency department and also inter-facility transfer would reduce morbidity and mortality rate among patients. Previous studies found that the delayed response time interval between call receipt and arrival on scene or during transferring the patients to the emergency department was another factor to reduce rates of death (Sae-Sia et al., 2014; Watanasiriwanich et al., 2013). According to context, input, process and product (CIPP) model (Stufflebeam, 1971 as cited in Zhang et al., 2011), quality of care system is related to CIPP model which is an evaluation model based on decision making (Boulmetis & Dutwin, 2005). In the emergency care system, the context refers to care that patients receive at the scene, emergency room, and during the inter-facility transfer care. Input refers to organization of care or care system

provided to the patients at the scene, emergency room, and during the inter-facility transfer care. Process refers to step of care referred to a system for transferring patients to the emergency department. Product included the provision of health services provided to patients. The outcomes are measured in terms of morbidity, mortality, complications, or satisfaction of the care providers. However, Thai emergency care system for the traffic injured patients has not been studied; therefore, the purpose of this study was to review prehospital care, emergency care at emergency department, and inter-facility transfer care of traffic injured patients.

Methods

The inclusion criteria were 1) articles related to prehospital care, emergency care, and inter-facility transfer, 2) Thai language articles published between year 2006–2015, and 3) cross-sectional descriptive designs, experimental design, cohort study, and review articles. The search terms were prehospital care, emergency department, inter-facility transfer, traffic accidents, road traffic crashes, motorcycle accidents. A review of 6 databases published after year 2006, including Thai LIS, PubMed, Google Scholar, Scopus, Science direct, and CINAHL were studied in this research. The first review process was started by creating an extraction table which proved by the research team. Then, this table was piloted using 3 articles to further improve its extraction components by the research team. In the second process, each author reviewed the abstracts and full text of articles to retrieve the articles that matched with the inclusion criteria. The duplicated articles were manually checked by the principle investigator. In the third process, two of team experienced researchers evaluated the articles according to the checklist of quality of the articles including the level of the evidence (Melnyk & Fineout-Overholt, 2005) strength and limitations of the articles. The Discrepancy Evaluation Model was used by the third research team.

Results

Total of 37 articles were reviewed, which composed of 9 studies in prehospital settings, 19 studies in emergency department, and 9 studies in inter-facility transfer settings. The literature analysis on trauma care in prehospital, emergency department, and inter-facility transfer found that 1/3 (58.70%) of the related literatures are descriptive research. Studies on emergency department were found more than those on prehospital and inter-facility transfer. The sample group included nursing staffs, health officials, patients, first responders, community volunteers, local administrators, and clients. Most of the research studies were associated with the development and evaluation of trauma and emergency care. Overall, the sample sizes were ranged from 15 to 380. Table 1

demonstrated the phases, sample characteristics study designs, and outcomes of the studies.

The data were analyzed based on the four elements of CIPP model. In terms of context component, most of the literatures (83.33%) examined the problems related to geography of the community, such as the unfamiliarity with the area of ambulance staff which delayed response time. Other problem was a lack of the capacity building of cooperative organizations. In addition, policy and formulating action plans to develop pathways of evacuation, transfer, or first aids were still lacking in local planning authority. In terms of inputs, most researchers discovered that the number of official staffs and equipment used in the three phases of care were insufficient. In terms of process, there was a shortage of medical specialists, administrative staffs, and proper materials. In addition, the performance of all related parties, especially in literacy, coordination, and decision making skills were totally inadequate. Most of the research intended to develop the guideline of pre-hospital care and inter-facility transfer by having coordination of regional hospitals or primary hospitals with sufficient medical specialists act as a coordinator and used the Internet as a tool for communication, as showed in the northeast and the central of Thailand (Jihing, 2008; Jearanaikulvanich, 2008). The use of technology helped to enhance the speed, coverage, and accuracy of the work. Moreover, a comprehensive database system facilitated the process of monitoring and evaluation as well. Finally, several evaluation criteria were analyzed as products included mortality rates, duration of delivering trauma patients, pain, capabilities of nurses, patient satisfaction, information received by patients and relatives, effectiveness of nursing care, and the level of severity perceived by patients (Table 1).

Table 1 Phases, sample characteristics, study designs, and outcomes of studies

Variables	Prehospital N (%)	Emergency department N (%)	Interfacility transfer N (%)
Level of evidence			
Level 6	6 (100%)	6 (100%)	4 (66.67%)
Level 7	-	-	2 (33.33%)
Year of publication (B.E.)			
2006-2009	6 (66.67)	4 (21.05)	4 (44.44)
2010-2013	2 (22.22)	14 (73.68)	4 (44.44)
2014-2015	1 (11.11)	1 (5.26)	1 (11.11)
Designs			
Descriptive	4 (44.44)	11 (57.89)	5 (55.56)
Experiment	2 (22.22)	-	-
Predictor	-	2 (10.53)	-
Qualitative	1 (11.11)	-	-
Clinical practice guideline	2 (22.22)	4 (21.05)	3 (33.33)
Literature review	-	2 (10.53)	1 (11.11)

Table 1 (Cont'd)

Variables	Prehospital N (%)	Emergency department N (%)	Interfacility transfer N (%)
Sample			
Profession	-	11 (57.89)	2 (22.22)
Patients	1 (11.11)	-	-
Non-profession	1 (11.11)	-	-
Profession and non profession	7 (77.78)	3 (15.79)	3 (33.33)
Patients and relatives	-	5 (26.32)	-
Document	-	-	4 (44.44)
Outcomes			
Context	3 (18.75)	1 (3.03)	2 (11.11)
Input	4 (25.00)	3 (9.09)	3 (16.67)
Process	3 (18.75)	13 (39.39)	5 (27.78)
Products	6 (37.50)	16 (48.48)	8 (44.44)
- Mortality	-	1 (6.25)	1 (12.50)
- Pain	1 (16.67)	2 (12.50)	-
- Nurses 'competencies	-	-	-
- Level of severity	-	3 (18.75)	-
- Satisfaction	-	1 (6.25)	2 (25.00)
- Survival rate	1 (16.67)	1 (6.25)	-
- Perception of information	-	-	-
- Skills	1 (16.67)	2 (12.50)	-
- Quality of care	1 (16.67)	-	1 (12.50)
- Clinical practice guideline	-	-	-
- Database	-	-	-
- Alcohol level	-	1 (6.25)	-
- Patients' need	1 (16.67)	5 (31.25)	1 (12.50)
- Health care provider's	1 (16.67)	-	-
- Knowledge	-	-	3 (37.50)

Remark Each study has outcomes more than one parameter.

Discussion

The discussion is based on the CIPP model of prehospital, emergency department, and inter-facility transfer settings. First, the trauma care determined various causes of delays in prehospital transport of road traffic injury patients due to the limited information of geography and rescue groups expertise in helping the injured patients in urban areas, the inconvenience of telephone and radio communications, improper aid and transfer from relatives, neighbors or the police, and the long period of time in transferring patients (Glunkwamdee et al., 2015). This research informed related factors in order to improve prehospital care quality which still required further development, especially in terms of the capability of staff. The study found that rescue staff had inadequate ability and insufficient knowledge and skills (Patthanapreechawong et al., 2012). National Institute of Emergency Medicine had defined the qualities and skills of rescuers based on their levels of training assessment.

For example, primary rescuers should be able to provide a proper first aid care, basic cardiopulmonary resuscitation, immobilization of the fracture sites, and transferring the injured patients (Suriyawongpaisal et al., 2014). However, the literature showed that primary volunteer rescuers and basic rescuers had inadequate knowledge and skills in helping injured patients. Therefore, these rescuers should be trained to enhance their knowledge and skills. Essential trainings should also be held for students and the community volunteers (Jearanaikulvanich, 2008; Sennunt et al., 2008). The development of care model was to improve how community and rescue staff work together to ensure coordinated support because the coordination of these two settings would help to promote the quality of care during prehospital phase (Kraysubun et al., 2009).

The essential inputs that determine the quality of trauma care in the emergency department were the competencies of nurses, management, ethics and professional law, personality, decision-making, problem-solving and teamwork (Dangsuwan et al., 2012; Kidsree, 2013; Tewapitak & Tobua, 2014). It was showed that many developmental research studies with multidisciplinary team presented better quality of nursing care. However, most studies were likely to focus on improving the care of patients with head injuries. The competencies of nurses in caring of patients with head injuries in the emergency department have been improved (Damkliang et al., 2015). In addition, there has been a development in the guidelines for common trauma care, including clinical practice for treating traumatic wounds (Tipo, 2008) and relieving traumatic pain (Nuchaiplot et al., 2014).The results also indicated that the use of developmental research designs did not only improve the quality of care, but also promoted professional competencies of providers. Nevertheless, these aforementioned studies were specifically conducted for a particular hospital, which has not yet extended to other hospitals and evaluated long-term follow-up and outcomes. The evaluations of trauma care in the emergency department found that there were few related studies scattered in a variety of variables. Each study could not be statistically compared with one another due to methodological flaws. Future replication studies are important for the continued progress of research.

The evaluation of the context and environment of trauma care during inter-facility transfer found that trauma patients did not receive a proper care during the transferring period due to a lack of ambulance staff and hospital care coordination. Moreover, the absence of electricity in some areas could easily lead to accidents. Thus, policies and budgets to develop inter-facility transfer system are critical components for improving trauma care (Sittichanbuncha et al., 2014). However, the technology advancement of wireless internet (WIFI) facilitated the connection between related parties, providing internet consultancy and improving inter-facility transfer through

express lines. The use of internet allowed patients to receive immediate treatments (Pitipornnarong & Ua-anuwong, 2013) and generate data that were beneficial to the analysis and evaluation of inter-facility transfer services (Thammakoon et al., 2009).

Current studies discovered a lack of experienced, knowledgeable, and skillful nurses in assessing patients' conditions while transferring them to the hospital (Sittichanbuncha et al., 2014). Thus, trauma care during inter-facility transfer was still a critical issue. The effects of inter-facility transfer on outcome in the studies were still weak and unclear. Most studies concentrated on trauma care in the hospital possibly because it has the largest database. Research found that nurses played a key role in leading the team and cooperating with related agencies in providing continuous trauma care. However, their roles during the pre-hospital phase were still unclear and lack of coordination among related parties. Nevertheless, further studies found that some data networks helped in developing systems of trauma care. However, the results also discovered problems in analyzing the data because the databases of patients with traumatic injured were in different system; therefore, the optimal uses of all of data were limited. In order to use the existing data from several databases including the Road Accident Investigation (RAI), the Injury Surveillance (IS) and the Information Technology for Emergency Medical System (ITEMS), these databases were suggested to be integrated in the same system.

Developing the capabilities of staffs who rescue trauma patients at the scene and hospital under the standard of the Institute of National Institute of Emergency Medicine should be considered as a policy and consistency of clinical practice guidelines. Moreover, there should be an evaluation system to provide effective feedback processes (Chaisiri & Chadbunchachai, 2008; Patthanapreechawong et al., 2012; Jearanaikulvanich, 2008; Thrakul et al., 2009) and necessary trainings for students and other individuals, such as community health volunteers to create an overall knowledgeable staff of trauma care during the pre-hospital phase. Additionally, the on-scene coordinator staff handling the transfer and the emergency department needed to have clear guidelines and system (Kraysubun et al., 2009) in order to provide a safe and prompt transfer. For example, developing information systems to efficiently transmit data and cooperating with local authorities in transferring patients to potential hospitals.

Conclusion

The reviews of trauma care in prehospital, emergency department, and inter-facility transfer indicated some areas of improvement including communication system in healthcare providers and other related organizations, competencies needed for healthcare providers working in the prehospital, emergency department, and inter-

facility settings. In addition, competencies of community health volunteers are also needed to be improved. The results of this review provide information for further studies to improve quality of care of the above three settings.

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