Original Article

Implementation of Clinical Nursing Practice Guideline for Treatment of Multiple Injury Patients Admitted to Emergency Department

Sumana Sumritrin, MNS[1], Suntaraporn Wunsupong, BNS[1], Pongladda Paralee, MNS[1], Pathranit Jirawatchotikan, MNS[1], Panor Techa-atik, MNS[1], Thanat Tangpaisarn, MD[2]

[1] Accidental and Emergency Unit, Division of Nurse, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand
[2] Department of Emergency Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Background: Trauma injury is the leading cause of death in Thailand. Multiple injury patients who receive nursing intervention according to the clinical nursing practice guideline for multiple injury patients are thought to be safer and less likely to experience complications. However, outcomes of using the guideline have yet to be systematically evaluated.

Objective: The present study aimed to assess outcomes experienced by multiple injury patients after implementation of the clinical nursing practice guideline.

Materials and Methods: The present study was a retrospective study. Patients enrolled in the study were over 18 years old and had been admitted to the Emergency Department of Srinagarind Hospital between January and December 2019 with an injury severity score (ISS) greater than or equal to 16.

Results: A total of 83 patients were enrolled, 70 (84.34%) of whom were male. The mean age of the patients was 36.33 years. Most of the injuries were caused by blunt force trauma (98.80%). The mean ISS was 28.10±8.50. The clinical nursing practice guideline for multiple injury patients had a 96.71% adherence rate, with 5 activities that had a 100% adherence rate: triage, circulation with hemorrhage control, disability assessment, exposure & environment control, and evaluation.

Conclusion: In practice, nurses followed the guideline to a high degree. Systolic blood pressure, pulse rate, body temperature, and oxygen saturation were improved factors after implementation of the clinical nursing practice guideline for multiple injury patients.

Keywords: Clinical nursing practice guideline, Multiple injury patients, Nursing outcomes

J Med Assoc Thai 2021;104(Suppl.1): S49-53
Website: http://www.jmatonline.com

Nowadays, trauma injury is a major public health problem in every country around the world[1], as multiple-system injuries can lead to complex illness. A large amount of blood loss, whether internally or externally, leads to shock and affects the function of various systems in the body, particularly the circulatory system, which can lead to oxygen depletion and hypoxia. Unstable vital signs can result in rapid changes in the patients' symptoms and death, immediately and up to 4 hours after injury[2-5].

In the United States, injury is the fifth leading cause of death, with 10 percent of injury-related deaths under the age of 45 and 40 percent occurring after hospitalization. Meanwhile in Thailand, injury is the second leading cause of death, with an estimated 49 deaths per 100,000 people[1]. Statistics of patients admitted to the accident and emergency unit of Srinagarind Hospital in the years 2017, 2018, and 2019 with injuries affecting various organ systems showed 2,305 cases, 2,434 cases, and 2,553 cases of severe symptoms, respectively. Of these, 397 cases, 512 cases, and 479 cases were hospitalized. Injured patients died in 0.66 to 1.04 percent of cases. Treatment that adheres to the appropriate guideline is expected to increase chances of survival and reduce cases of disability[1].

In order to improve management of trauma patients' care, guidelines have been developed in collaboration with the Thai Trauma Nurses Society to comply with nursing quality indicators. However, outcomes of applying the clinical nursing practice guideline for multiple injury patients have yet to be systematically evaluated. Therefore, this study aimed to evaluate implementation of the guideline within the emergency department (ED).

Materials and Methods

This was a retrospective study with a single-center

Correspondence to:
Sumritrin S.
Accidental and Emergency Unit, Division of Nurse, Khon Kaen University, Khon Kaen 40002, Thailand.
Phone: +66-43-363714, **Fax:** +66-43-366870
Email: md221@kku.ac.th

How to cite this article:
Sumritrin S, Wunsupong S, Paralee P, Jirawatchotikan P, Techa-atik P, Tangpaisarn T. Implementation of Clinical Nursing Practice Guideline for Treatment of Multiple Injury Patients Admitted to Emergency Department. J Med Assoc Thai 2021;104 (Suppl.1): S49-53.
doi.org/10.35755/jmedassocthai.2021.S01.12221

trial design aimed at evaluating the outcome of implementing the clinical nursing practice guideline for multiple injury patients. The sample size was calculated based on the findings of previous study[5]. In order to achieve a significance level of 5% and power of test of 0.8, we determined that a sample size of 83 would be required. A medical chart review with a systematic sampling method and non-return sample selection was used. Patients with an injury severity score (ISS) greater than or equal to 16, as recorded between January and December 2019, were enrolled in the study. Patients with missing data were excluded. Ethics approval was given by the Khon Kaen University Ethics Committee for Human Research (HE631161). The requirement for informed consent from patients was waived, as patient confidentiality protection was guaranteed by identifying each patient by a unique study number rather than by name.

The data in the study consisted of personal data; illness information; a completed 8-step multi-system trauma nursing practice assessment form (T-ABCDE-AE) that included: 1) Triage, 2) Airway & C-spine, 3) Breathing ventilation & adequate oxygenation, 4) Circulation with hemorrhage control, 5) Disability, 6) Exposure & environment control, 7) Adjuncts, and 8) Evaluation; and the clinical nursing outcome assessment, including vital signs and consciousness assessment, Glasgow Coma Scale (GCS), and blood oxygen saturation. Statistical analysis was performed using SPSS for Windows Version 16.0 (SPSS Inc., Chicago, IL, USA). Categorical data was presented as percentages, and continuous data using means and standard deviations. Univariable analysis was performed using a two-sample t-test for numerical data and a Chi-squared test or Fisher's exact test for data comparison between the two groups.

Results

A total of 83 patients were enrolled (Table 1), 70 (84.34%) of whom were male. The mean age of the patients was 36.33 years. Most of the injuries were caused by blunt force trauma (98.80%). The mean ISS was 28.10±8.50.

Nursing practices demonstrated 96.71% adherence to the clinical nursing practice guideline for multiple injury patients, with 100% adherence to 5 of the activities: triage, circulation with hemorrhage control, disability, exposure & environment control, and evaluation (Table 2).

After the clinical nursing practice guideline was followed, most of the multiple injuries were classified as Class II shock, with 56.63% at initial treatment and 63.86% before discharge. The number of patients with Class III shock decreased (Table 3).

A comparison of vitals during initial treatment versus before discharge found that after nursing practices were carried out in accordance with the guideline, systolic blood pressure had changed from (SBP) 120.40 to 123.45 mmHg, pulse rate (PR) from 94.10 to 101.52 times/minute, and oxygen saturation from 91.81% to 98.76% (Table 4).

Table 1. Characteristics of multiple injury patients (n = 83)

Item	Number (%)
First doctor assessment	
Emergency physician	32 (38.55)
Trauma physician	51 (61.45)
Mode of arrival	
Walk-in	7 (8.43)
Emergency medical services	37 (44.58)
Referral	39 (46.99)
Mechanism of injury	
Blunt	82 (98.80)
Penetrating	1 (1.20)
Triage level	
Level 1 resuscitation	31 (37.35)
Level 2 urgent	45 (54.22)
Level 3 less-urgent	6 (7.23)
Level 4 non-urgent	1 (1.20)
Mode of operation	
Admitted	76 (91.57)
Emergency operation	7 (8.43)

Discussion

The findings from this study show that nurses have a high average adherence to the nursing practice guideline. According to trauma patient care principles, initial assessment (primary survey for trauma) must be triaged, and patients must be assessed to rapidly identify life threatening injuries and to resuscitate if necessary[3,6].

Patients with multiple injuries must be classified to assess severity in order to manage life threatening conditions. Consistent with previous research on evidence-based nursing as applied to trauma patients, trauma classification was demonstrated to have 100% adherence, as it is a necessary activity in phase 1 of trauma nursing practice conducted upon the patient's arrival at the emergency room[7]. A study on quality of care for trauma patients at a university hospital emergency room found that the triage system was the optimal management practice among operator's management practices in the ED[8].

The leading cause of death among multiple injury patients is issues arising from circulation and hemorrhaging. Based on previous research, nurses in the ED must assess the circulatory system, prepare for hemostasis, and monitor for shock, with continuous recording of clinical signs and monitoring of blood pressure[9]. Shock management requires assessing the body's response. Gathering information and conducting diagnostic tests related to trauma and shock conditions within the first 4 minutes improves the quality of care and greatly benefits trauma patients admitted to the ED[10].

Table 2. Adherence to clinical nursing practice guideline for multiple injury patients (n = 83)

Clinical nursing practice guideline	Overall indication	Nurse adherence; n (%)
1) Triage	83	83 (100)
2) Airway & C-spine	83	82 (98.79)
3) Breathing ventilation & adequate oxygenation		
3.1) O_2 mask with reservoir bag 10 to 12 LPM	77	76 (98.70)
3.2) Prepare for definite airway	44	43 (97.73)
4) Circulation		
4.1) Initiate 2 large-bore catheters with warm IV	83	83 (100)
4.2) Prepare for: fluid replacement	76	76 (100)
4.3) Prepare for: blood resuscitation	19	19 (100)
4.4) Medical administration	11	11 (100)
5) Disability: monitor N/S, LOC	83	83 (100)
6) Exposure & environment control: keep warm	83	83 (100)
7) Adjuncts		
7.1) Monitor EKG	83	72 (86.75)
7.2) Monitor V/S, SpO_2	83	83 (100)
7.3) Trauma lab	83	83 (100)
7.4) AMPLE	83	57 (68.67)
8) Evaluation	83	83 (100)
Total		(96.71)

Table 3. Shock characterization (n = 83)

Class of shock	Initial treatment, n (%)	Before discharge, n (%)
Class I	15 (18.07)	14 (16.87)
Class II	47 (56.63)	53 (63.86)
Class III	17 (20.48)	9 (10.84)
Class IV	4 (4.82)	7 (8.43)

Regarding the disability assessment process, the nurse must evaluates the patient's GCS and level of consciousness, as is consistent with previous research which has shown the necessity of the GCS score in informing assessment of clinical nursing outcomes for the patient[8].

In controlling and assessing exposure & environment, the patient must be examined for additional injuries, and the environment, particularly the temperature, must be controlled to prevent the development of hypothermic conditions[6,11]. This is consistent with previous research that investigated the outcomes of surgical treatment strategies in multiple trauma ICU patients. Key treatment involves controlling the patient's body temperature to prevent hypothermia[12].

An evaluation process must be carried out after every nursing practice. The patient and clinical outcomes of each practice must be assessed and the treatment plan adjusted according to nursing process principles[1,7,8].

Nursing activities that had a low average adherence rate in practice were adjuncts, particularly the EKG examination. This could be due to prioritizing other primary surveys during emergency resuscitation, such as those for airway, breathing, circulation, and disability. Monitoring EKG requires additional equipment and time for preparation and installation. Therefore, it is possible that a later phase of treatment or secondary survey was administered when there were additional resources[6]. Similarly, difficulties that may be faced when taking additional history such as AMPLE include unconscious patients with no known relatives. In these cases, AMPLE can also be assessed further at a later stage or in a secondary survey after the patient has developed a life-threatening condition[7].

Classification of shock levels among the trauma patients after the nursing practice guideline had been followed showed that most of the trauma patients had a Class II shock level. The number of patients with Class III shock was reduced, but injuries in the Class II and Class IV shock levels had increased. Patients with severe trauma, such as intra-abdominal bleeding, bleeding of internal organs, or abdominal ruptures, and for whom bleeding is not effectively stopped, will experience increased blood loss after injury. This is consistent with the principle of resuscitation to control loss of injury (damage control resuscitation)[13]. Although trauma patients are cared for according to the nursing practice guideline

Table 4. Comparison of parameters at initial assessment versus before discharge (n = 83)

Vital sign	Initial, Mean ± SD	Before discharge, Mean ± SD	t	*p*-value
Systolic blood pressure (mmHg)	120.40±31.56	123.45±27.84	21.728	0.000*
Respiratory rate (per minute)	21.25±8.67	21.52±5.82	-0.322	0.748
Pulse rate (per minute)	94.10±32.31	101.52±28.08	-6.689	0.000*
Body temperature (C)	39.44±19.63	37.07±14.10	18.242	0.000*
Oxygen saturation (%)	91.81±22.01	98.76±1.93	-2.871	0.005*
Glasgow coma scale (points)	10.36±4.72	10.54±4.68	-0.608	0.545

* Statistical significance

corresponding to permissive hypotension and hemostatic resuscitation principles[13,14], the severity and location of the injury may lead to constant blood loss and an inability to stop the bleeding, requiring that surgery be performed as soon as possible to stop the bleeding.

After the nursing practice guideline was followed, SBP, PR, body temperature, and oxygen saturation were in the expected ranges and met criteria. The introduction of nursing practice guidelines to the care system of trauma patients should be discussed further. A supervisory process for applying nursing guidelines must be carried out to evaluate their effectiveness with multiple systems of trauma and to continuously surveil adherence to the nursing practice guideline when treating patients with different levels of shock. This will ensure timely assistance and protection against threats and will result in a safe outcome for the patient, without complications[8]. The present study was limited in that data was gathered from only one center and in that the study design was retrospective, which may have resulted in incomplete data collection[15-19].

Conclusion

Nurses demonstrated a high average adherence to the practice guideline. SBP, PR, body temperature, and oxygen saturation improved after implementation of the clinical nursing practice guideline for multiple injury patients.

What is already known on this topic?

Trauma injury is a major public health problem around the world because multiple system injuries can lead to complex illness.

What this study adds?

The clinical nursing practice guideline improved management of multiple injury patients along a number of factors.

Acknowledgement

The authors would like to thank the Executive Committee of the Accident and Emergency Nursing Division, Srinagarind Hospital, who facilitated data collection and Vanessa Moll for their role as English consultant.

Conflicts of interest

The authors declare no conflict of interest.

References

1. Teeradechakul N, Promchai N, Ponsane N. Effective of nursing development the multiple injury patient with multiple injury nursing management guideline. Med J Srisaket Surin Buriram Hosp 2018;33:165-77.
2. Frink M, Lechler P, Debus F, Ruchholtz S. Multiple trauma and emergency room management. Dtsch Arztebl Int 2017;114:497-503.
3. Lansink KW, Gunning AC, Leenen LP. Cause of death and time of death distribution of trauma patients in a Level I trauma centre in the Netherlands. Eur J Trauma Emerg Surg 2013;39:375-83.
4. Negoi I, Paun S, Hostiuc S, Stoica B, Tanase I, Negoi RI, et al. Mortality after acute trauma: Progressive decreasing rather than a trimodal distribution. J Acute Dis 2015;4:205-9.
5. Yoosook S, Suwanmontri P, Charoenrat P, Ninsonthi N. Developing a Model of Care for the Multiple Trauma Hypovolemic Shock Patients in Sawanpracharak Hospital. J Dept Med Serv 2017;42:96-101.
6. American College of Surgeons. ATLS: Advanced Trauma Life Support. 10th ed. Chicago, IL: American College of Surgeons; 2018.
7. Techaatik P, Wunsupon S, Sumritrin S. effectiveness of implementing evidence-based practice for traumatic patients at out patient of the accident and emergency unit. J Nurs Sci Health 2011;34:65-74.
8. Saimai P, Norasan S, Unhasuta K, Keskaew C. Quality care of trauma patients at resuscitation unit in the university hospital. J Public Health 2016;46:223-35.
9. Freeman Williamson L, Kautz DD. Trauma-informed care is the best clinical practice in rehabilitation nursing. Rehabil Nurs 2018;43:73-80.
10. Christie RJ. Therapeutic positioning of the multiply-

injured trauma patient in ICU. Br J Nurs 2008;17:638-42.
11. Pfeifer R, Tarkin IS, Rocos B, Pape HC. Patterns of mortality and causes of death in polytrauma patients-has anything changed? Injury 2009;40:907-11.
12. Zhang LY, Yao YZ, Jiang DP, Zhou J, Huang XK, Shen Y, et al. Surgical treatment strategy for multiple injury patients in ICU. Chin J Traumatol 2011;14:42-5.
13. Wise R, Faurie M, Malbrain M, Hodgson E. Strategies for intravenous fluid resuscitation in trauma patients. World J Surg 2017;41:1170-83.
14. Cirocchi R, Montedori A, Farinella E, Bonacini I, Tagliabue L, Abraha I. Damage control surgery for abdominal trauma. Cochrane Database Syst Rev 2013;(3):CD007438.
15. Apiratwarakul K, Jumroenketpratheep K, Ienghong K, Ruttanaseeha W, Buranasakda M, Bhudhisawasdi V. Hand hygiene of emergency medical service healthcare providers. J Med Assoc Thai 2020;103:8-10.
16. Apiratwarakul K, Ienghong K, Gaysonsiri D, Buranasakda M, Bhudhisawasdi V, Tiamkao S. Role of Motorcycle-Based Ambulance (Motorlance) in Major Sporting Events. J Med Assoc Thai 2020;103:15-7.
17. Ienghong K, Kulsutcharit K, Apiratwarakul K, Gaysonsiri D, Mitsungnern T, Bhudhisawasdi V. Characteristics and mortality in high-, intermediate-, and low-risk acute pulmonary embolism patients in the emergency department. J Med Assoc Thai 2020;103:42-6.
18. Apiratwarakul K, Pumiyoch P, Ienghong K, Phungoen P, Gaysonsiri D, Bhudhisawasdi V. Endotracheal intubation on a stationary vs. moving ambulance. J Med Assoc Thai 2020;103:18-21.
19. Apiratwarakul K, Srimookda N, Phungoen P, Ienghong K, Tiamkao S, Bhudhisawasdi V. Presepsin Levels in Emergency Patients with Bacterial and Viral Infection. Open Access Maced J Med Sci 2020;8:20-3.