

Effectiveness of Implementing Emergency Nursing Intervention on Clinical Outcomes of Abdominal Trauma Patients

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Abstract:

Background: The nurse must be aware of specific assessment findings that are associated with abdominal trauma and immediate recognition of problems and prevention of occurrence complications. **The aim of this study** was to determine the effectiveness of implementing emergency nursing intervention on clinical outcomes of abdominal trauma patients. **Design** quasi experimental research design was used. Setting the study was conducted at causality hospital affiliated to Tanta University and Elminshawy general hospital affiliated to Ministry of health. **Sample** a convenient sample of (60) adult patients who had abdominal trauma injury, had inclusion criteria and scheduled for emergency nursing intervention was selected and divided randomly into two equal groups, 30 patients in each group. **Tools of the study:** three tools were used for data collection: trauma patient assessment tool, hemodynamic instability score, and an observational check list. **The results** showed that half of the control and study groups had substantial beginning requirements and that the patient has a robust continuous volume need for the examined patient (score 4). Also, half of the control and study groups had large-resolved prearrival hypotension or tachycardia (score 1) before the emergency nursing intervention, whereas fewer than three quarters of the control and study groups had never been hypotensed or tachycardic. After the nursing intervention, there was a statistically significant difference in the mean total score between the control and study groups. **Conclusions:** patients showed an improvement in their hemodynamic stabilization, Glasgow coma scale (GCS) equal 15, decrease length stay and free from complications after received emergency nursing intervention. **Recommendations:** Implementation of emergency nursing intervention for abdominal trauma patients upon admission until

Keywords :

Emergency Nursing Intervention, Clinical Outcomes, Abdominal Trauma Patients

Introduction:

Trauma is defined as physical damage to the body caused by an energy exchange with the environment that exceeds the body's resistance (injury). There are more abdominal injuries than torso or head traumas. Significant abdominal trauma is

seen in up to 20% of severe trauma patients and is connected to a 20% higher mortality risk. Some abdominal organs are more vulnerable to harm from trauma than others. In addition, the degree of injury depends on the size and location of the abdominal organs. ⁽¹⁻³⁾ The abdomen is the third most

common area of the body to be injured, behind the head and neck. The size and location of abdominal organs can have a role in the course of injury. Uncontrolled bleeding from the liver, spleen, or other big blood vessels, as well as infection, are the most common causes of morbidity in abdominal penetrating trauma patients.⁽⁴⁾

Aside from that, the most common causes of death and disability are gastrointestinal perforation and peritonitis. Abdominal penetrating trauma encompasses injuries caused by sharp instruments (stab wounds) and gunshot wounds. The knife is the most frequent culprit.⁽⁵⁻⁸⁾

When a blunt abdominal injury occurs, the aggressive agent does not penetrate the peritoneal cavity. By the abdomen or through kickback and deceleration, the offending agent's effects are conveyed to the viscera. About 13 percent of blunt trauma victims have abdominal visceral lesions, with the spleen and liver being the most often affected organs. 75 to 80 percent of all blunt abdominal injuries are the result of car accidents. A fall from a height, an attack with a blunt item, a sports injury, and a fall from a bicycle may all result in a blunt abdominal injury.^(9,10)

Abdominal trauma symptoms include pain in the abdomen; vomiting; hematuria; or retention of urine; bleeding per rectum; breathlessness; or chest pain; discoloration; fullness in the flanks; marked generalized distension; external signs of injury; absence of respiratory movements; and evidence of free fluid.⁽¹¹⁾

In order to reduce mortality in abdominal trauma patients, risk variables must be identified and examined in a systematic manner. The clinical indications of blunt abdominal trauma are typically ignored

because they are less visible, but the diagnosis of a piercing abdominal trauma is simpler and more dependable. Abdominal trauma patients should be assessed and resuscitated in accordance with the advanced trauma life support sequence of airway, breathing, and circulation because airway compromise causes death in seconds, breathing derangement causes death in minutes, and circulatory impairment causes death in hours.⁽¹¹⁾

Hospitalization, permanent disability, and death are all common outcomes from abdominal traumas that occur. Wound infection, wound dehiscence, ruptured abdomen, paralytic ileus, and disseminated intravascular coagulopathy are the most prevalent consequences of abdominal trauma. Pneumonia, hypovolemic shock, urinary tract infection, and peritonitis are all examples of septic conditions.^(11,12)

Those who have an open abdomen are more likely to spend a lot of time in the hospital and in the intensive care unit (ICU). Acute respiratory failure, thrombosis, and an abdominal abscess are all possible problems for individuals with an open abdomen. To detect and treat life-threatening injuries, every trauma victim needs a rapid, accurate, and systematic evaluation that is thorough and consistent. From the prehospital setting to the intensive care unit (ICU), abdominal trauma necessitates an interprofessional and interdisciplinary approach.⁽²⁾

In intensive care units, critical care nurses perform the majority of direct patient care. **Primary survey: ABCs** for all trauma patients, the evaluation process should begin with a primary survey, which entails removing the patient's clothing and placing him or her on a variety of monitors (blood

pressure, heart rate, pulse oximeter, etc.) as necessary. The femoral vein, subclavian, or internal jugular vein may be used if IV access is not possible. Cutdown of the venous system may be necessary in certain circumstances. In youngsters, an interosseous line may also be used if alternative access is unavailable.⁽³³⁾

During resuscitation, the ABCs (airway, breathing, and circulation) are routinely monitored. The patient's blood loss must be evaluated. It's important to keep an eye on the patient for symptoms of bleeding and to determine how much blood has been lost. There should be bulky bandages in place to support any object that is impaled in the abdomen until further examination and/or surgical removal may take place. In cases when there are visible organs or eviscerations, sterile saline dressings should be used. Non-rebreather masks and NG tubes (if no facial injuries have occurred) are often used to provide oxygen, and blood samples are used to determine the patient's blood type.⁽³³⁾ A second survey: A more comprehensive examination of the patient is performed in order to select the most appropriate diagnostic tests (often after initial standard x-rays of later cervical spine, supine chest, and pelvis).⁽³⁴⁾

Significance of the study in order to ensure that nurses are able to provide safe, high-quality care in an emergency situation, an emergency nursing intervention protocol must be developed. When dealing with abdominal trauma, a very methodical approach is required. Abdominal trauma is evaluated and treated using a multidisciplinary strategy that includes a primary, secondary, and tertiary survey method. To reduce morbidity and mortality and give analgesia, each survey includes

steps to identify and treat injuries sequentially. In addition, a few studies on the nursing care of abdominal trauma victims have been conducted. So that's the end of the research.

Aim of the Study: Determine the effectiveness of implementing emergency nursing intervention on clinical outcomes of abdominal trauma patients.

Research Hypothesis:

Abdominal trauma patients will exhibit improvement in their clinical outcomes have hemodynamic stabilization, Glasgow coma scale (G C S) equal or more than 13, decrease length of stay post implementation of nursing intervention

Subjects and methods

Research Design :

Quasi-experimental research design was utilized in this study. Setting of the study : The study was conducted at causality hospital affiliated to Tanta University and Elminshawy general hospital affiliated to Ministry of health .

Subjects - :

A convenient sample of (60) adult patients who have abdominal trauma injury, have inclusion criteria and scheduled for emergency nursing intervention. The sample size was calculated based on the epidemiological information program according to the patients admission in the hospital at 95% confidence power of the study will be selected and divided randomly into two equal groups, 30 patients in each group

Group one: Control group, 30 patients suffered from recent abdominal trauma injury will receive routine nursing care by hospital nursing staff divided into two equally sub groups: 15 patients in each group.

Group two: Study group; 30 patients suffered from recent abdominal trauma this group will receive emergency nursing intervention protocol as designed and implemented by researcher and divided into two subs equally groups:15 patients in each group.

Inclusion criteria: the subjects were selected according to the following criteria adult patients have the following- :

Recent Abdominal trauma grade one and two (spleen, liver, intestine and pancreas),18-55years, Both sexes (Males & Non pregnant females)

Exclusion criteria : Patients have the following characteristics :1-Extra abdominal trauma e.g., head, chest, urological, orthopedic and cardio thorathic.

2-Chronic diseases e.g., Diabetes Mellitus, Hypertension and cancer

Tools for data collection: -three tools were developed to collect for this study Tool (I) Trauma patient assessment tool: -Structured interview tool was developed by the researcher to collect the data after review of relevant literature and will consists of two parts:

Part (1): Biosocio-demographic data: which included patient name, age, marital status, educational level and occupation.

Part (2): Health assessment tool: it included past and present medical history, diagnosis, previous& duration of hospitalization, family history, allergy to medication, assessment of circulation, airway, breathing abdominal trauma type, the pattern of abdominal injury, time of injury, mechanism of trauma, associated injuries and vital signs.

Part (3) :- Laboratory Investigations

Part (4): Bates-Jensen Wound Assessment Tool (BWAT):

It was developed by Bates-Jensen in 1990 and revised in 2001⁽²²⁾. Is a valid and reliable tool that is used to assess and monitor healing of all types of wounds. The modified total BWAT scores were divided into three severity categories: Mild severity 13–30, Moderate severity 31–40 and Extreme severity 41–65

Part (5) Revised Trauma Score (RTS):

It was developed by Champion HR, et al at September 1981⁽²³⁾, adopted by researcher it considered a prognostic value with decreasing the chance of patient survival at 12 points or less.

Delayed equal to score (12), Urgent equal to score (11), Immediate equal to score (3-10), Dead equal to score (0)

Tool (II): Hemodynamic assessment tool: it includes; Hemodynamic instability score: was developed by Iowa Methodist Medical Center, Des Moines and revised at 2014⁽²⁴⁾. It provides a useful framework for classifying a trauma patient's hemodynamic status with blunt abdominal injury according to responses to resuscitation.

Tool (III): An observational check list: this tool will be developed by the researcher after reviewing the relevant literatures as a monitoring tool for control group to assess the emergency nursing care. The performance score is low equal to <60% :73%, moderate equal to 74:79 % and high equal to ≥ 80.

Method: Official permission was obtained from the Faculty of Nursing of Tanta University to the responsible authorities and the head of causality hospital and Elmenshawy general hospital after explaining the aim of the study to facilitate the researcher implementation.

Ethical and legal considerations:

Written witnessed consent was obtained from every patient included in the

In the assessment of CABDE (control of blood flow and bleeding, airway maintenance with C-spine stabilization, breathing and ventilation, disability/neurological status, exposure/environmental control to prevent hypothermia), abdominal trauma type, pattern of abdominal injury and time of injury, trauma mechanisms, associated injuries, vital signs and wound assessment are all taken into consideration.

a- **2) planning phase:** The researcher created an emergency nursing intervention for abdominal trauma patients based on an analysis of their assessments and requirements. The emergency nurse intervention was presented to each patient and one of the patient's family members.

b- **3-implementation phase.** a- In the emergency room, it was successfully implemented for all patients in group two by the researcher (study group). After the recent abdominal trauma patient arrived at the emergency unit, everything began. working with tool (III)The following topics were addressed in the course of emergency nurse intervention: **Give priority for primary survey to rapidly identify treatable life-threatening emergencies during the first few minutes of the initial evaluation as:**

- 1- Establish a clear air way, assure ventilation. Control external bleeding.
- 2- Set up of IV infusion of normal saline or ringer lactate.
- 3- Insert a naso gastric tube, begin suction, monitor output.
- 4- Send a blood sample for HB, blood group, cross match.

5- Insert urinary catheter, examine the urine for blood and monitor output.

c- **Perform secondary survey which include:**

1- Complete physical examination to evaluate the abdomen to establish the extend of other injury. Examine the abdomen for bowel sounds, tenderness, rigidity, contusion or open wounds. Administer small doses of antibiotics and tetanus prophylaxes.

2- Assess and perform nursing measure to relieve pain and massage technique.

d- **Emergency care for circulatory status for stable blunt abdominal trauma is observation or computed tomography (CT).**

The program of emergency nursing intervention protocol was carried out 72hours for hemodynamic condition and last for one week for wound assessment.

Group I (control group): will be exposed to routine hospital care prescribed by physician.

4- Evaluation Phase: Evaluation was done for both groups

Results

Table 1: Percent distribution of patient's current history Both the control and study groups were diagnosed with abdominal trauma and no other injuries, according to this table. There were 60 percent in the control group and 66 percent in the study group who had blunt abdominal injuries, as shown in the figure (14). 66.7 percent of the control and study groups received road traffic accident-related injuries, according to this data. In terms of the location of abdominal damage, 53.3% of the control group and 63.3% of the study group both suffered injuries to the middle quadrant. In addition, over half of the study and control groups were impacted by abdominal

trauma, with the intestine being the most common organ injured (43.3 percent and 40 percent, respectively). About one-third (33.3 percent) of those in the research group and one-third (30 percent) of those in the control group had enlarged spleens or livers. Lacerations accounted for 56.7% of all wounds in the research group, compared to 46.7% in the control group, as seen in Figure 3. In terms of duration of stay, the control group's mean score was 21.8 5.719, whereas the study group's mean score was 11.46 2.012.

Table (2): Percent distribution of post abdominal trauma patients' according to assessment patient's vital signs and circulation: Before and after intervention with nursing care, the control group's average body temperature was 36.72 degrees Celsius (+0.359), while the study group's average body temperature was 36.78 degrees Celsius (+0.308), with statistically significant differences between the two groups. There are statistically significant changes between the control and study groups before and after the nursing intervention in terms of pulse, respiration blood pressure, capillary refill, skin color.

Table 3: Percent distribution of the studied patient according to hemodynamic assessment for before and after the emergency protocol of abdominal trauma patient nursing care

This table shows about half (46.7%) and a half (50.0%) of the control and study group had a large initial requirement and the patient need vigorous ongoing volume requirement (score 4) respectively before the emergency protocol. And also, this table clarifies 40.0% and 30.0% of the control and study group had modest ongoing volume requirements (score 3) respectively.

There was no statistically significant difference between the mean of the total score of the control and study group were $\chi^2 = 0.863$ and p-value = 0.650. Related to after the nursing intervention. It presents that about half (50.0%) and less than three quarters (70.0%) of the control and study group had large resolved prearrival hypotension or tachycardia (score 1) and never hypotensive or tachycardia respectively. There is statistically significant difference between the mean of the total score of the control and study group were $\chi^2 = 10.403$ and p-value = 0.006.

Table 1: Percent distribution of patient's current history (n=60)

Recent history	Control group (n= 30)		Study group (n=30)		Total (n= 60)	
	No.	%	No.	%	No.	%
Type of abdominal trauma						
Blunt trauma	18	60.0	20	66.7	38	63.3
Penetrating trauma	12	30.0	10	33.3	22	36.7
Mechanism of trauma						
Road traffic accident	20	66.7	24	80.0	44	73.3
Falling from hight	6	20.0	3	10.0	9	15.0
Stab	4	13.3	3	10.0	7	11.7
Site of abdominal trauma						
Upper quadrant	8	26.7	6	20.0	14	23.3
Middle quadrant	16	53.3	19	63.3	35	58.3
Lower quadrant	6	20.0	5	16.7	11	18.4
Organ affected from abdominal trauma #						
Liver	9	30.0	6	20.0	15	25.0
Intestine	12	40.0	13	43.3	25	41.7
Spleen	6	20.0	5	33.3	11	18.4
Pancreas	6	20.0	8	26.7	14	23.3
Associated injuries						
No associated injury	30	100.0	30	100.0	60	100.0
Type of wound						
Contusion	4	13.3	3	10.0	7	11.7
Penetrating	12	30.0	10	33.3	22	36.7
Lacerated	14	46.7	17	56.7	31	51.7
Length of stay (Days)						
Range	13 - 30		9 - 15		9 - 30	
Mean ± SD	21.8 ± 5.719		11.46 ± 2.012		16.633 ± 6.754	

More than choice

Table 2: Percent distribution of post abdominal trauma patients' according to assessment patient's vital signs and circulation (n=60)

Vital signs and circulation	Control group (n= 30)				χ^2 / t-test P	Study group (n=30)				χ^2 / t-test P
	Before		After			Before		After		
	No.	%	No.	%		No.	%	No.	%	
Temperature										
Normal	30	100	30	100.0	--	30	100.0	30	100.0	--
Range	36.1 – 37.3		36.5 – 37.5		1.542	36.1 – 37.3		36.3 – 37.0		2.941
Mean \pm SD	36.72 \pm 0.359		36.90 \pm 0.332		0.096	36.78 \pm 0.308		36.52 \pm 0.231		0.002*
Pulse										
Tachycardia	29	96.7	20	66.7	9.017	27	90.0	9	30.0	22.500
Normal	1	3.3	10	33.3	0.003*	3	10.0	21	70.0	0.0001*
Range	100 – 133		93 – 130		3.516	98 – 135		82 – 100		5.517
Mean \pm SD	122.100 \pm 8.953		112.430 \pm 8.953		0.001*	117.633 \pm 11.654		117.633 \pm 11.654		0.001*
Respiration										
Tachypnea	29	96.7	22	73.3	6.405	27	90.0	5	16.7	32.411
Normal	1	3.3	8	26.7	0.011*	3	10.0	25	83.3	0.0001*
Range	20 – 27		18 – 25		1.739	20 – 26		16 – 22		6.891
Mean \pm SD	24.033 \pm 1.828		22.323 \pm 1.768		0.048*	23.366 \pm 1.956		18.432 \pm 1.092		0.0001*
Blood pressure										
Hypotension	30	100.0	15	50.0	20.000	30	100.0	0	0.0	60.000
Normal	0	0.0	15	50.0	0.0001*	0	0.0	30	100.0	0.0001*
Diastolic										
Range	50 – 65		55 – 80		7.028	52 – 67		65 – 82		18.953
Mean \pm SD	59.300 \pm 3.931		65 \pm 3.931		0.001*	58.566 \pm 3.802		75.320 \pm 3.541		0.0001*
Systolic										
Range	70 – 88		75 – 99		10.756	70 – 85		88 – 115		15.839
Mean \pm SD	81.033 \pm 3.718		89.024 \pm 3.210		0.011*	78.766 \pm 4.157		104.990 \pm 4.921		0.0001*
Capillary refill										
Present	21	70.0	29	96.7	7.680	18	60.0	30	100.0	15.000
Absent	9	30.0	1	3.3	0.006*	12	40.0	0	0.0	0.0001*
Skin color										
Pale	25	83.3	15	50.0		24	80.0	3	10.0	
Cyanosis	5	16.7	2	6.7	6.786	6	20.0	0	0.0	49.333
Pink	0	0.0	13	43.3	0.0001*	0	0.0	27	90.0	0.0001*

* Statistically significant difference at (P<0.05)

Table 3: Percent distribution of the studied patient according to hemodynamic assessment for before and after the emergency protocol of abdominal trauma patient nursing care (n=60)

Hemodynamic assessment	Control group (n= 30)		Study group (n=30)		Statistical test	
	No.	%	No.	%	χ^2	P
Before the emergency protocol						
Hypotensive or tachycardia responded to less than 2 liters initial volume loading and no ongoing volume requirement. (Grade 2)	4	13.3	6	20.0	0.863	0.650
Modest ongoing volume requirement. (Grade 3)	12	40.0	9	30.0		
Large initial requirement and the patient need vigorous ongoing volume requirement (Grade 4)	14	46.7	15	50.0		
After the emergency protocol						
Never hypotensive or tachycardia (Grade 0)	10	33.3	21	70.0	10.403	0.006*
Resolved prearrival hypotension or tachycardia (Grade 1)	15	50.0	9	30.0		
Hypotensive or tachycardia responded to less than 2 liters initial volume loading and no ongoing volume requirement. (Grade 2)	5	16.7	0	0.0		

Discussion:

Trauma continues to be a major cause of emergency room visits across the world. Abdominal trauma has a substantial impact on trauma patient morbidity and death. ⁽¹³⁾ In order to detect and treat life-threatening injuries as quickly as possible, every trauma victim needs a thorough, systematic examination. A multidisciplinary and trans-professional strategy is needed in the management of abdominal trauma, from the pre-hospital setting through the intensive care unit (ICU) and post-discharge rehabilitation. To evaluate their impact on abdominal trauma patients' outcomes. The results of this research show that all of the patients in the control and study groups were diagnosed with abdominal trauma and had no other injuries connected with them. About two-thirds of the people in both the control and research groups had suffered blunt trauma, according to the findings. The control and study groups both contained more than two-thirds of their members who had experienced trauma as a result of being involved in a car accident. Increased use of automobiles, inadequate road infrastructure, and urbanisation all have a role. Researchers from Chalya et al. (2015) ⁽¹⁷⁾ found that individuals with blunt abdominal injuries and those with penetrating abdominal injuries had similar outcomes in their research. Road traffic accidents (RTAs) are the most prevalent cause of injury, accounting for more than two hundred and twenty percent of the injured patients. Most patients suffered blunt abdominal injuries, as indicated by Ntundu et al. (2019) ⁽¹⁴⁾, according

to this research. In contrast, Nyongole et al. (2013) ⁽¹⁸⁾ said that the spleen was the most often wounded intra-abdominal organ in blunt abdominal injuries, whereas the gastrointestinal tract was the most frequently affected in penetrating abdominal injuries. Penetrating injuries are more likely to damage the gastrointestinal system than blunt ones, according to Suthar & Mewada, (2012) ⁽¹⁹⁾. According to the results of this research, there was a statistically significant change in pulse, respiration, blood pressure, capillary refill, and skin colour before and after nursing intervention. Abdominal trauma patients' outcomes may be affected by the use of emergency nursing protocols. Holmes J (2017) ⁽²⁰⁾ found that in his research, there was a notable improvement in clinical treatment and an improvement in patient vital signs. Results showed that half of the control and study groups had substantial beginning requirements and that the patient has a robust continuous volume need for the examined patient (score 4). Also, half of the control and study groups had large-resolved prearrival hypotension or tachycardia (score 1) before the emergency nursing intervention, whereas fewer than three quarters of the control and study groups had never been hypotensed or tachycardic. After the nursing intervention, there was a statistically significant difference in the mean total score between the control and study groups. About a fifth of the participants in the research had diabetes or heart disease, which might have an impact. All patients in this

series were hemodynamically stable, rendering the first vital signs inaccurate to accurately identify bleeding patients, according to Carlos et al. (2015)⁽⁹⁸⁾. Individuals with class III or IV haemorrhage maintained a "normal" blood pressure (mean SD, 122 17 mm Hg) despite statistical disparities across patients. The trauma bay commonly blames increased heart rates on pain, agitation, or exogenous medications, yet these patients were tachycardic (average SD, 111 37 beats/sec). However, Thompson (2013)⁽⁹⁹⁾ has already highlighted the unreliability of the heart rate and blood pressure in trauma patients. he concluded that tachycardia was not a reliable indicator of hypotension after trauma since it was neither sensitive nor specific. If hypotension is predicted in patients with haemorrhage of class III and IV, our investigation found no evidence of it in these individuals. As a result, individuals who should have been tachycardic due to a class II bleeding episode were not⁽⁹⁹⁾

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