

Avoiding Pitfalls in Trauma Triage: Effect of Nursing Staff Development

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Abstract: Aim: This study aims to evaluate the effect of nursing staff development on avoiding pitfalls in trauma triage. Methods: A quasi experimental design was used. This study was carried out at emergency department of surgery at El-Demerdash Hospital and Children Hospital, affiliated to Ain Shams University. Sample: A purposive sample composed of 40 emergency nurses, 20 were dealing with children and rest of them 20 were dealing with adults, add to 200 trauma patients (100 adults and 100 children with school age) from the above mentioned settings. Tools: 1) Self administered questionnaire to assess nurses' knowledge (pre/post tests), 2) Factors affecting triage process assessment sheet (pre- test) 3) An observation checklist to assess: nurses practice and potential errors in trauma triage (pre/post tests), 4) Nurses opinionair sheet (pre- test) and 5) Clinical data sheet for trauma patients (pre/post tests) Results: There are insignificant differences between studied nurses reports regarding sources of information in triage decision making and factors affecting triage process, added to trauma triage errors reduction among them in post tests .Moreover, nurses knowledge and practice were improved post training . Conclusion: Nursing staff development through training sessions was helpful on avoiding pitfalls in trauma triage. *Recommendations:* The study reinforces the need for sustained training on triage intervention. Further studies should be done to assess the long term effects of such study on trauma patient's outcome at the emergency department. [Soad M. Hegazy, Lamiaa A. El-Sayed, Tarek Y. Ahmed, Mohamed Rady. **Avoiding Pitfalls in Trauma Triage: Effect of Nursing Staff Development.** *Life Sci J* 2012;9(1):1006-1014] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 144

Key words: Trauma triage pitfalls, nursing staff development.

1. Introduction:

Triage is the classification of patients according to medical need and it was developed to categorize the injuries into emergent, urgent and non-urgent. It starts at the front door of the emergency department and repeatedly performed as management of patient evolves. In general, the principles of triage are the same for children and adults, though the priority of children over adults within the same categories is controversial. In recent years, trauma and triage have become more prominent. Development of triage, which to an extent has arisen as a result of trauma has gone some way to overcoming this problem .Researches suggests that, triage has a positive effect on patient waiting times and patient / nurse satisfaction (*Derlet & Richards, 2008 and Johansen & Forberg, 2011*).

Triage is a central task in an emergency department, viewed as rating of patients' clinical urgency to identify the order in which patients should be given care and is not needed if there is no queue for care. Triage scales aim to optimize waiting time of patients according to severity of their medical condition and to treat as fast as necessary the most intense symptoms added to reducing negative impact on prognosis of a prolonged delay before treatment. Moreover, Triage decisions may be based on both, patients' vital signs (respiratory rate, oxygen

saturation in blood, heart rate, blood pressure, level of consciousness and body temperature) and their chief complaints. In children, triage poses a greater challenge, as measurements of vital signs, particularly of blood pressure, are difficult to obtain and cooperation is limited. Triage is often a major determinant of outcome (*Gautschi et al., 2008 and Durand et al., 2011*).

In children special considerations were found regarding mechanisms of injury compared to adults as follows: Head injuries account for approximately 60% of all injuries, which can be explained by large and heavy heads relative to the bodies. Furthermore, unconsciousness, children with upper airways tend to get obstructed by their relatively large, flaccid tongue or kinked because of large head flexion induced by short occiput. The less mature thermoregulatory mechanism and higher surface area-to-mass ratio which make heat loss and hypothermia more common in them, particularly during exposure to extreme conditions, such as cold weather, decontamination with cold water during biochemical events, or when undressed at triage. As children have relatively small amounts of blood (80 ml/kg), so minor bleeding represent a significant volume loss and severe shock (*Kyle, 2008 and Fuzak & Mahar, 2009*).

Triage is the most fundamental and important aspect of management of emergency department. It cannot be operationalized in such a way that just anyone can safely perform this critical duty. It requires in-depth knowledge skills that nurses have to learn to keep them oriented with the changes in their roles and functions, and modify their attitudes and understanding (Goh, 2009 and Lee, 2010). The complex and skilled nature of triage require a highly competent health care professional. The ability of emergency nurse on triage to assess, intervene and communicate effectively helps establish rapport and trust with patient and significant others. Research suggests that, triage has a positive effect on patient waiting times and patient/nurse satisfaction (Peitzman et al, 2008 and Acharya, et al, 2011).

Staff development and continuing education are shown to cover a very broad expanse of responsibilities. Health care organizations have put into place staff development departments, sometimes called nursing education . Staff development nurses are responsible for a wide array of duties, beginning with orientation of new staff: from newly graduated nurses, to those returning to nursing or changing areas of practice, to experienced nurses changing location but not areas of expertise. The educational needs of each group are different and should be addressed differently. Some researches into stress and coping factors for nurses gives insight into how important a role staff development can be in assisting nurses cope with the unique problems faced in today's health care milieu. When nurses feel they are doing well, they report satisfaction with their accomplishments, feel challenged and enjoy learning new skills (Budd, 2007 and Daleen, 2010).

Significance of the Study:

Attendance at emergency department has increased in recent years. The majority of trauma deaths occur either before reach the hospital or within four hours of arrival, pre-hospital and emergency department personnel must make rapid triage decisions based on pre-established system standard. The problem of inappropriate attendance remains and traditional methods of patient reception do not adequately deal with differing degrees of serious injuries. This can lead to long waiting times for dangerous injuries and a poor service for minor injuries. Although children may account for 10 to 100% of victims in mass casualty events and disasters, most of the triage studies to date have focused on adult population. Increasing attendance at emergency departments presents a major challenge to staff and demands highest level of knowledge and skills to provide safe and competent care (Hoot &

Aronsky, 2008, Kirkpatrick et al., 2009 and Lerner et al, 2010).

Aim of the study:

This Study aims to evaluate the effect of nursing staff development on avoiding pitfalls in trauma triage.

This aim was achieved through the following:

- Identify the pitfalls in trauma triage among the emergency nurses.
- Identify the factors that influence triage process.
- Assess emergency nurses knowledge and practice regarding trauma triage.
- Develop and implement training sessions about trauma triage and common pitfalls.
- Evaluate the training sessions effects on nurses knowledge and practice, added to patients conditions outcomes.

Research hypothesis :

It was hypothesized that nursing staff development will be helpful on avoiding pitfalls in trauma triage at emergency department.

2. Subjects and Methods:

Operational definition:

Nursing staff development: means training sessions for nursing staff at emergency department.

Design:

A quasi – experiment design was adopted in the following phases: pre-training assessment, training intervention, post intervent and follow-up.

Setting:

This study was conducted in the emergency department of surgery at El-Demerdash Hospital and children Hospital, which are affiliated to Ain shams university.

Subjects:

A purposive sample included two groups, the first one was all available emergency nurses from both Hospitals, 20 from each one. Second group included 100 adult and 100 children (school age) with different injuries from the above mentioned settings.

Tools for data collection:

1- Self-administered questionnaire sheet that was designed by the researchers after reviewing related literature and consulting experts. It was written in simple Arabic language and divided into the following:

- Characteristics of the studied nurses as regards age, qualifications and experiences.
- Nurses knowledge regarding; definition, assessment, site, level of triage, life saving measures, secondary assessment and nursing intervention (pre/post test).

The satisfactory level was from 70% while the unsatisfactory level was less than 70%.

- 2- Assessment sheet to identify the factors affecting trauma triage process as regards: time constraints, formal training and environment (pre-test).
- 3- An observation check list (pre/ post tests), adapted from: *Lewis et al. (2004)*, *Kyle (2008)* and *Peitzman et al (2008)*. It was used to assess the following:
 - Common potential errors in trauma triage by the emergency nurses as regards: assessment, diagnosis, discharge documentation, standard of care and waiting time (pre/post tests).
 - Nurses practice on trauma triage process: primary assessment, life saving measures, secondary assessment and nursing intervention (pre/post tests). A correct answer was scored as (1) while the incorrect (zero). It was scored into either inadequately done (less than 75%) or adequately done (75% or more).
- 4- Nurses opinionnaire sheet about sources of information which used in triage decision making (pre – test).
- 5- Trauma patients clinical data sheet. It was used to obtain the following:
 - Characteristics of trauma patients (adult and children) e.g age and gender.
 - Different injuries among studied patients (pre- test)
 - Levels of triage for the studied patients (pre-test)
 - Patients conditions outcomes (discharge home – discharge against medical advice – transferred to ward – death) (post test).

Validity and reliability of study tools :

Content validity was ascertained by a group of experts including medical–surgical nursing, General surgery and nursing administration. Their opinions were elicited regarding to the tools format layout, consistency, scoring system. The tools content were tested regarding to the knowledge accuracy, relevance and competence. Reliability of all items of an observation checklist was done using test – retest that revealed that, all items were significant and has a correlation coefficient above the significance level ($r= 0.9$).

Ethical considerations and human rights:

In the planning stage approval was obtained from authorities in El-Demerdash Hospital and Children Hospital. Verbal consent was then obtained from the directors of the above mentioned settings and the head nurses. All nurses were informed about the procedure and their rights according to medical research ethics, that they were free to decide whether or not they would participate in the study. Then a written informed consent was obtained from each nurse who agreed to participate in the study.

Pilot study:

A pilot trial was carried out on 10% of the total study sample to test the clarity and practicability of the tools, in addition to subjects and settings. Pilot subjects were later included in the study as there were no radical modifications in the study tools.

Procedure of the study:

- Sampling was started and completed within 6 months.
- Purpose of the study was simply explained to studied nurses prior to any data collection.
- The researcher started to collect data from first time on the same day of trauma patients admission to emergency department, using the pre – constructed tools.
- Questionnaire sheet regarding trauma triage knowledge, assessment sheet about the factors effecting triage process, added to opinionnaire sheet about sources of information used in triage decision making were filled in and completed by the studied nurses while they were on duty.
- An observation checklist for trauma triage practice and common pitfalls in triage process were filled in and completed by the researchers while they were observe nurses on duty hours - Clinical data sheet for trauma patients were filled in by the researcher from first moment of patients arrival at Hospital .
- The researchers were available two days / week at morning and afternoon shifts on the emergency department.
- The training was designed based on analysis of the actual educational needs assessment pre training by using the pre-constructed tools and consistent with related literature. In addition, meeting nurses level of understanding.
- Beginning of training included classification of the studied nurses into groups, each group consisted of 5-6 nurses, then orientation of the nurses about training objectives, outline, schedule, expected outcomes and benefits.
- Conduction of theoretical part was preformed through lectures and group discussions using data show and pictures as media. It was taken in 8 hours for 4 sessions, which were covered on two weeks. The sessions covered the following items: definition of triage, primary assessment, site and level of triage, life saving measures, secondary assessment and nursing intervention.
- Conduction of practical part began at previously mentioned settings whereas each group obtained 4 sessions (one session weekly for 3 hours). First session: primary assessment. Second session: life saving measures e.g (CPR, shock, choking, bleeding and wounds trauma). Third session: seconsery assessment. Fourth session: nursing

intervention. It was performed through demonstration, redemonstration, role play, simulator manikin, real objects, first aid kits and orthopedic supplies.

- Evaluation of the training was done through pre / post and 3 months follow -up tests using previous tools to measure the change in emergency nurses knowledge and practice and reduction of common pitfalls in triage procedure among nurses. The researchers were rotated on morning and afternoon shifts to evaluate nurses.

Statistical analysis:

Data were presented using numbers, percentages and chi-square test. Level of significance was threshold at 0.05.

3. Results:

Table (1): Presents demographic characteristics of the studied nurses and patients. Results revealed that more than one third of the studied nurse (adults and pediatric) had the age from 35- < 45 years (35.5% and 31.0% respectively). Moreover, nearly two fifths of them had diploma degree (42.5% and 41.0% respectively). Insignificant differences were indicated between adults and pediatric nurses regarding to their age, qualifications and years of experience with $X^2 = 2.12, 4.4$ and 0.06 respectively, $P > 0.05$. As regards characteristics of the studied trauma patients, less than one fifth of adults (16.0) had the age from 50.0 yrs and more. In addition, more than two third of children and adolescent (71.5) had the age from 12 –< 20 yrs.

Table (2): Reveals frequency distribution of trauma patients with different injuries. As shown, there is insignificant difference between the studied adults and children with different trauma regarding to their triage, with ($P > 0.05$). Meanwhile, for shocking, significant difference was found ($P < 0.01$).

Figure (1): Shows different levels of trauma patients triage. There is insignificant difference between the studied subjects (adults and children) in relation to triage levels, whereas level I ($X^2 = 2.0$), level II ($X^2 = 0.06$), level III ($X^2 = 0.96$), level IV ($X^2 = 0.27$), $P > 0.05$.

Table (3): Presents sources of information used in triage decision making among studied nurses. As shown insignificant differences was found between adults and pediatric nurses regarding to the sources of information, with ($X^2 = 0.02, p > 0.05$).

Table (4): Indicates the factors that influence trauma triage process. As obvious, insignificant difference was found between nurses (adults and pediatric) regarding the factors: interruptions ($X^2 = 0.015, p > 0.05$), time constraints ($X^2 = 0.16, P > 0.05$) and lack of formal training ($X^2 = 0.14, p > 0.05$).

Table (5): Presents potential errors in trauma triage among emergency nurses pre/post training. There is statistically significant difference between nurses errors in all items of triage post training with $X^2 = 24.4, P < 0.001$. Meanwhile insignificant difference was found in follow up test, with $X^2 = 9.0, p > 0.05$.

Table (6): Displays satisfactory nurse's knowledge regarding trauma triage pre/post training. As found the percent of all items was high in immediate post- Test and the differences between scores were significant in all items ($X^2 = 91.7, p < 0.001$). Meanwhile, in follow up test no statistically significant difference was indicated with $X^2 = 2.03, P > 0.05$.

Table (7): Shows satisfactory nurses' practice regarding trauma triage pre/post training. There is statistically significant difference between nurses practice in all items post training with $X^2 = 18.7, P < 0.001$. Regarding follow up test no significant difference was found, with ($X^2 = 0.11, p > 0.05$).

Table (8): Shows satisfactory nurses' intervention regarding assessment indicators pre/post training. As noticed significant improvement was found post training with $X^2 = 50.4, P < 0.001$. Meanwhile, in follow up test no significant difference was indicated with $X^2 = 0.82, p > 0.05$.

Figure (2): presents trauma patient's discharge and outcomes. As observed percentage of home discharge was higher among children (31.0%) than adults (24.0%). Meanwhile percentage of children death was lower (10.0%) than adult (15.0%).

Table (1a): Characteristics of the studied nurses (n = 40).

Items	Adult's nurses (n= 22)	Pediatric nurses (n = 18)	Test
Age/yrs			
20 - < 30	43.0	38.5	$X^2 =$
30 - < 40	35.5	31.0	2.12
40 & more	21.5	30.5	$P >$
			0.05
Qualification			
Diploma	42.5	41.0	$X^2 =$
Diploma with speciality	10.0	19.5	4.4
Bachelor	36.0	27.5	$P >$
Master degree	11.5	12.0	0.05
Years of experience			
5 - < 10	69.5	71.0	$X^2 =$
10 & more	30.5	29.0	0.06
			$P >$
			0.05

Table (1b): Characteristics of the studied trauma patients

Items	Adults (n = 100)	Children (n = 100)
Age / yrs		
6 - < 12		28.5
12 - < 20		71.5
20 < 30	34.5	
30 - < 40	28.0	
40 - < 50	21.5	
50 & more	16.0	
Gender		
Boys		61.5
Girls		38.5
Male	66.5	
Female	33.5	
Ways of transportation		
Ambulance	64.0	57.0
Private	36.0	43.0

Table (2): Distribution of trauma patients according to their injuries (n = 200)

Items	Adults n = 100	Children n = 100	X ² value
- Head injury	25.1	34.2	2.0*
- Shocking	31.0	48.0	6.0**
- Electric shock	9.3	6.0	0.7*
- Bleeding	46.0	44.0	0.3*
- Chest injury	12.2	7.0	1.5*
- Extremity, bone, joint and tissue injury	67.0	75.3	1.7*
- Back pain	23.1	14.2	2.7*
- Abdominal injury/pain	54.0	47.0	1.6*
- Ear injury	11.0	9.0	0.7*
- Ear ringing	8.2	6.1	0.6*
- Wounds	77.0	83.0	1.2*

* Insignificant at P > 0.05

** Significant at P < 0.01

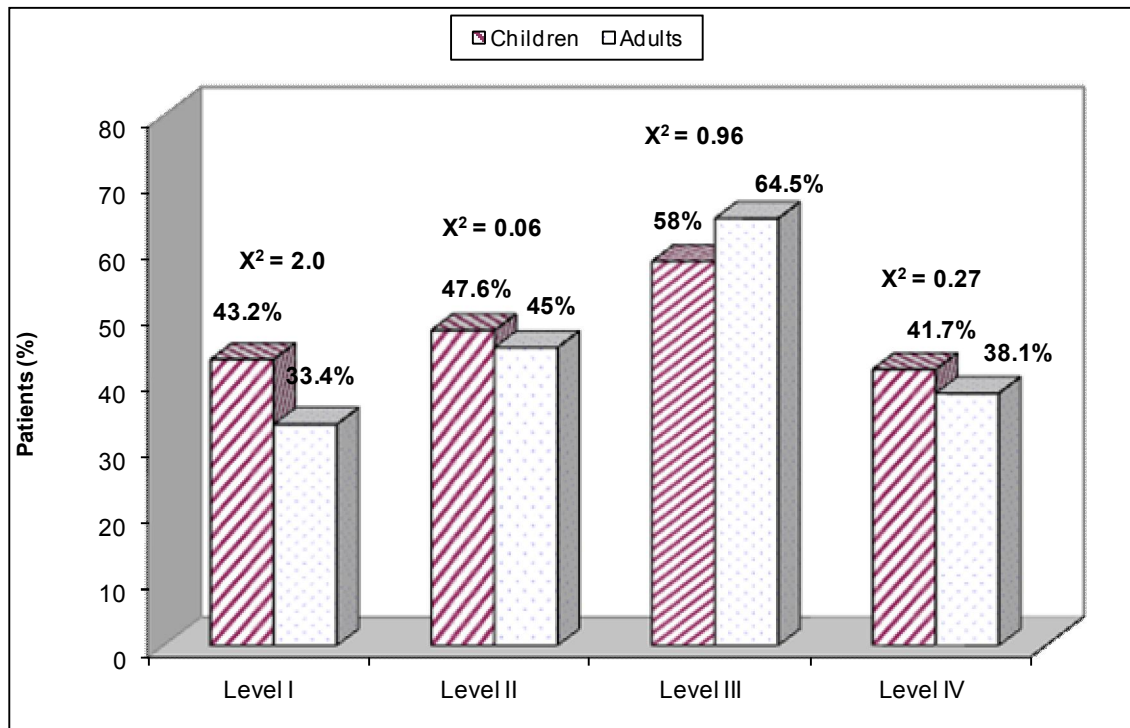


Figure (1): Shows different levels of triage among the studied trauma patients.

* Insignificant, P > 0.05.

Level II (evaluated within 20 minutes).

Level IV (non urgent).

Level I (evaluated immediately).

Level III (evaluated within 2 hours).

Table (3): Sources of information used in triage decision making among studied nurses

Items	Adults' nurses n = 22	Pediatric nurses n = 18	X ² value
- Clinical experience	45.2	41.0	0.52*
-Pre – hospital personnel and patient	9.0	7.5	0.67*
-Intuition	15.4	12.2	0.44*
- Triage guidelines	9.3	8.1	0.05*
- Pre – established triage criteria	12.6	10.4	0.25*
- Physicians verbal instructions	35.1	42.2	1.1*
X ² = 0.02 *, P > 0.05			

* Insignificant at P > 0.05.

Table (4): Factors that influence triage process among the studied nurses

Items	Adults' nurses n = 22	Pediatric nurses n = 18	X ² value
Interruptions	44.0	41.0	0.015*
- Other patients enquiries			
- Sudden case occurring in waiting hall	76.0	74.0	
- Arrival of new patients.	82.0	79.0	0.16*
Time constraints	86.0	84.0	
Lack of formal training	67.0 69.0		0.14*
- Poor assessment skills			
- Medical knowledge not updated	71.0	68.0	
- No constructive feedback and advice from colleagues	84.0	81.0	

* Insignificant at P > 0.05.

Table (5): Potential errors in trauma triage pre/post training among studied nurses (n=40)

Items	Pre %	Post %	Follow-up %
- Incorrect assessment	65.1	59.7	49.0
- Failure to diagnose	46.7	38.3	34.7
- Inappropriate discharge	68.3	65.0	62.3
- Incomplete or poorly documented record	92.4	79.1	68.6
- Failure to comply with standard of care	56.1 74.2	42.4 68.3	38.4 66.1
- Long waiting time			
1X ² = 24.4 P < 0.001		2X ² = 9.0, P > 0.05	

1X² (Between pre and post)

2X² (Between post and follow-up)

Table (6): Satisfactory nurses' knowledge regarding trauma triage pre/post training (n = 40).

Items	Pre %	Post %	Follow-up %
- Definition of triage	42.1	100.0	100.0
- Level and tag of triage	12.3	94.1	89.0
- Site of triage	33.0	100.0	100.0
- Primary assessment	56.1	91.2	88.1
- Life saving measures	36.2	100.0	100.0
- Secondary assessment	18.4	95.1	93.0
- Nursing intervention	14.5	89.1	87.2
1X ² = 91.7 P < 0.001		2X ² = 2.03 P > 0.05	

1X² (Between pre and post).

2X² (Between post and follow-up).

Table (7): Satisfactory nurses' practice regarding trauma triage pre/post training (n = 40).

Items	Pre %	Post %	Follow-up %
- Primary assessment	53.6	84.1	81.7
- Life saving measures	76.1	91.2	89.0
-Secondary assessment	22.3	66.7	65.1
- Nursing intervention	64.7	88.4	87.0
1X ² = 18.7 P < 0.001		2X ² = 0.11 P > 0.05	

1X² (Between pre and post).

2X² (Between post and follow-up).

Table (8): Presentation of satisfactory nurses' intervention regarding assessment indicators (n = 40).

Items	Pre %	Post %	Follow-up %
- Airway/cervical spine	42.1	87.2	82.0
- Breathing	51.3	91.3	88.1
- Circulation	46.4	89.5	86.3
- Disability	35.6	92.1	87.4
- Level of Conscious	44.7	93.2	89.1
1X ² = 50.4 P < 0.001		2X ² = 0.82 P > 0.05	

1X² (Between pre and post).

2X² (Between post and follow-up).

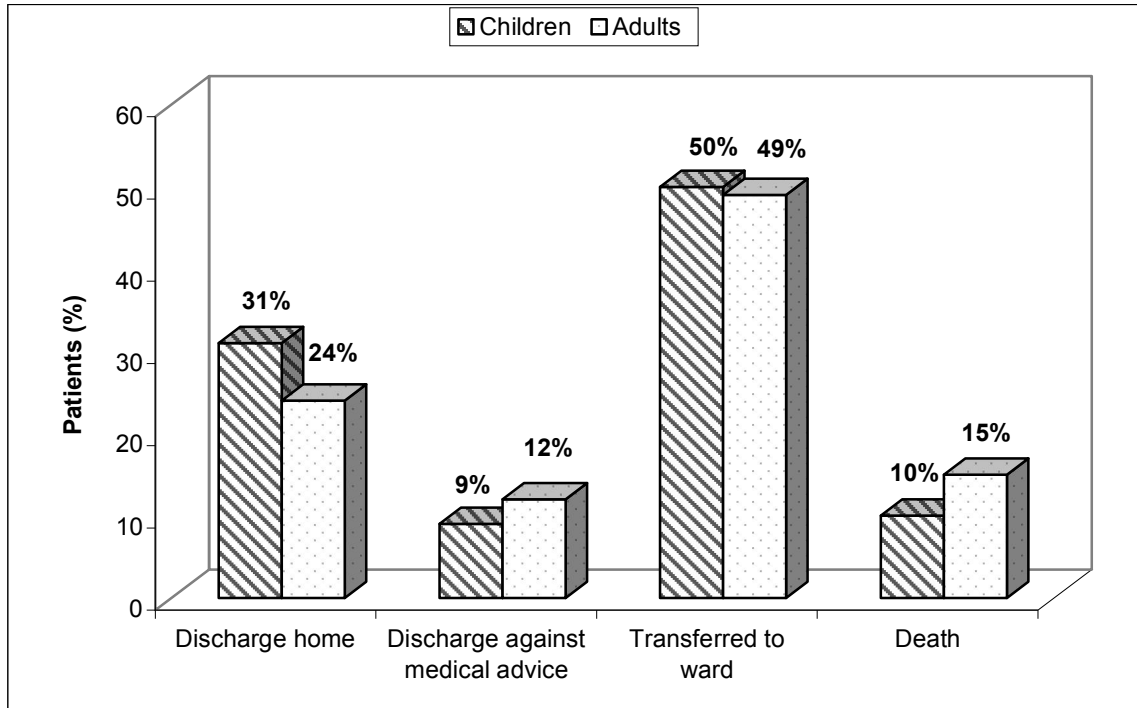


Figure (2): Presentation of studied trauma patients' discharge and outcomes

4. Discussion:

Triage is an important tool to determine and classify the clinical priority of the patients presenting at emergency departments (Lee, 2010 and Lerner et al, 2010). Discussion within this research highlights the effects of nursing staff development on avoiding pitfalls in trauma triage. The current study revealed that, nearly two fifths of the studied emergency nurses had diploma degree. The previous finding indicated that, nurses had inadequate information about trauma triage. Hegazy et al. (2010) reported that education has a vital role in improving nurses' knowledge and consequently improve the quality of care.

Concerning years of experience for studied nurses, results presented that more than two third of them were less than ten years of experience. This finding could be attributed to the fact that emergency department need more effect and healthy personnel to work hard. Moreover, older nurses got the feeling and beliefs that they had enough experience which makes them efficient in their performance, another interpretation is that older nurses had administrative role so, they faraway from practical field. The previous finding was in accordance with Abd El Sattar & Hegazy (2002) and Daleen (2010).

On the same line, more than half of the studied patients were transported by ambulance. According to Gautschi et al (2008) it is important that in the pre-hospital phase and during transportation, trained

paramedical personnel should be able to identify indicators of danger and assess overall status of patient and planning for appropriate mode of transport.

Regarding emergency nurses sources of information used in triage decision making. Results revealed the sources were included clinical experience physicians' verbal instruction. The previous result was in agreement with Durand et al. (2011) who claimed that, all nurses had no knowledge before joining on the emergency department about triage, because they were working after graduation in different units, which led them acquiring general knowledge not specific to trauma triage.

Concerning emergency nurses' knowledge and practices about trauma triage pitfalls, the present study showed significant improvement post training sessions. The previous findings may be due to lack of training and absence of triage nurse. Cone et al. (2009) and Timothy Lant & Megan Jehn (2011) reported that, triage is the most fundamental care and emergency nurse require a broad knowledge base to provide safe and competent care to trauma patients with a variety of injuries.

As regards the follow up tests, slight reduction was noticed in nurses' knowledge and practice. This results may be explained as, presence of the researchers' contact with the nurses for any guidance or clinical demonstrations. The previous results were

in agreement with *Abd El Sattar and Hegazy (2002)*, who recognized that numerous researches and articles concerned with knowledge and skills retention supported the promise that more frequent training was required. In addition, initial review is recommended as early as 2-4 weeks after training, then periodic reviews every 3-6 months until retraining at one year.

In relation to the potential errors in trauma triage among studied nurses. The present study indicated that they were: incorrect assessment, failure to diagnose, inappropriate discharge, poor documentation, failure to comply with standard of care and long waiting time. *Ventolini and Neiger (2003)* stated that, to determine seriousness of each patient's problem, the assessment must be conducted by a suitably educated first level nurse. *Forsgren et al (2009)* and *Simonet (2009)* recognized that, basic principles that run through a good emergency plan, are that nurses should perform best especially under stressful situations.

Considering, long waiting time which may result in serious consequences. *Rutschmann et al. (2005)* and *Lehmann et al. (2009)* concluded that, the number of interruptions and length of time patients wait in pretreated period have been significantly correlated in one study of triage implementation. According to *Thompson & Dowding (2004)* and *Amram et al. (2011)*, trauma triage in the emergency department help to decrease waiting times, improve patient satisfaction, make more efficient use of physician time, concentrate urgent medical care, and streamline traffic.

In the same context, lack of formal training in triage leads to error. It has been shown that experienced emergency nurse misclassify about 10% to 20% of patients. The error rate for untrained nurses is higher. *Johansen and Forberg (2011)* stated that, in the emergency room it is important for nurses to make fast, accurate decisions about the seriousness and urgency of the patient. Moreover, In experienced nursing and medical staff who do not use a formal method for assessing urgency will have error rates somewhere.

Regarding trauma patients' discharge and outcomes, this study revealed that children have a better prognosis than adults. *Lehmann et al. (2009)* reported that children tolerate multiple organ injuries better than adults, have unique physiologic and anatomic characteristics and differ from adults in several ways. *Fuzak and Mahar (2009)* claimed that, children have more pliant and flexible bones, so have fewer bone fractures. In addition, they have less mature regulatory mechanism and higher surface area to mass ratio which make heat loss and hypothermia more common in them according to *Kyle (2008)*,

Children may tolerate hypovolemic stress better than adult, added to their separation from parents which cause emotional trauma .

Conclusion:

Overall, the study has indicated that, nursing staff development through training sessions in the surgical emergency department was helpful on avoiding the pitfalls in trauma triage.

Recommendations:

- The study reinforces the need for sustained education and training for triage implementation with any advance in nursing practice for emergency nurses.
- Revision of job description and role specification should be made.
- Specific protocols for trauma patients should be tailored to their needs.
- Further studies should be done to assess the long term effects of such study on trauma patient's outcome at the emergency department, added to triage intervention by emergency nurses.

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References:

1. Derlet, R. and Richards, J. (2008): Ten solutions for emergency department crowding. *West J Emerg Med.*, 9: 24-7.
2. Durand, A., Gentile, S., Devictor, B., Palazzolo, S., Vignally, P., Gerbeaux, P. and Sambuc, R. (2011): ED patients: how nonurgent are they? Systematic review of the emergency medicine literature. *Am J Emerg Med*, 29: 33-45.
3. Gautschi, O., Cadosch, D., Rajan, G. and Zellweger, R. (2008): Earthquakes and trauma: review of triage and injury-specific, immediate care. *Prehospital and Disaster Medicine*, April, 23(2).
4. Hoot, N. and Aronsky, D. (2008): Systemic review of emergency department crowding: Causes, effects and solutions. *Ann Emerg med.*, 52: 126-36.
5. Rutschmann, O., Chevalley, T., Zumwald, C., Lutby, C., Vermeulen, B. and Sarasin, F.

- (2005): Pitfalls in the emergency department triage of frail elderly patients without specific complaints. *Swiss Med Wkly*, www. Smw. Ch., 145-150.
6. Simonet, D. (2009): Cost reduction strategies for emergency services: insurance role, practice changes and patients accountability. *Health Care Anal*, 17: 1-19.
 7. Lerner, E., Schwartz, R., Coule, P., Pirrallo, R. (2010): Use of SALT triage in a simulated mass-casualty incident . *Pre – hosp Emerg Care*, 14(1):21-25.
 8. Cone, D., Serra, J., Burns, K., MacMillan, D., Kurland, L., Gelder, C. (2009): Pilot test of the SALT Mass Casualty Triage System. *Pre -hosp Emerg Care*, 13(4):536 - 540.
 9. Abd El- Sattar, M. and Hegazy, S. (2002): Effect of trauma triage intervention guidelines on emergency nurses' performance. *The Egyptian Medical Journal*, 19(1): 5-7.
 10. Hegazy, S., Hassan, M., El-Sayed L. and Mosbeh, A. (2010): Enhancing nurses' competency to maintain technologic devices at critical care units. *The New Egyptian Journal of Medicine*, November, 43 (5): 7 – 16.
 11. Lewis, S., Heitkemper, M. and Dirkson, S. (2004): *Medical – Surgical nursing*, (6th ed.), st Louis, USA : Mosby.
 12. Budd, J. (Dec 01, 2007). *staff development and funding*. Retrieved Friday, Dec 02, 2011, from <http://allnurses.com/showthread.php?t=264993> .
 13. Kirkpatrick, A., Ball, C., Campbell, M., Williams, D., Parazynski, S., Mattox, K. and Broderick, T. (2009): Sever traumatic injury during long duration spaceflight: Light years beyond ATLS. *Journal of Trauma Management and outcomes*, 3: 4.
 14. Ventolini, G. and Neiger, R. (2003): Avoiding the pitfalls of obstetric triage. *OBG Management*, July, 7: 12.
 15. Lee, C. (2010): Disaster and mass casualty triage. *Virtual Mentor*, June, 12 (6): 466 – 70.
 16. Amram, O., Schuurman, N. and Hameed, S. (2011): Mass casualty modeling: a spatial tool to support triage decision making. *Int J Health Geogr*, June, 10: 8 – 13.
 17. Aacharya, R., Gastmans, C. and Denier, Y. (2011): Emergency department triage: an ethical analysis. *BMC Emergency Medicine*, 11: 16.
 18. Forsgren, S., Forsman, B. and Caristrom, E. (2009): Working with Manchester triage – Job satisfaction in nursing. *International Emergency Nursing*, October, 17: 226 – 32.
 19. Goh, S. (2009): Bomb blast mass casualty incidents: initial triage and management of injuries. *Singapore Med J*, 50 (1): 101.
 20. Peitzman, A., Rhodes, M., Schwab, C., Yealy, D. and Fabian, T. (2008): *The trauma manual: trauma and acute care surgery*. 3rd ed., Lippincott Williams and Wilkins, Philadelphia.
 21. Lehmann, R., Beekley, A., Casey, L., Salim, A. and Martin, M. (2009): The impact of advanced age on trauma triage decision and outcomes: a statewide analysis. *Am J Surg*, May, 197 (5):571 – 4.
 22. Fuzak, J. and Mahar, P. (2009): Emergency department triage. *Hospital Pediatric Juan Manuel Marquez, Habana, Cuba*, 30/ 1.
 23. Timothy Lant, J. and Megan Jehn, J. (2011): Building evidence for legal decision making in real time: legal triage in public health emergencies. *Disaster Medicine and Public Health Preparedness*, 5: 242 – 51.
 24. Thompson, C. and Dowding, D. (2004): Strategies for avoiding pitfalls in clinical decision making. *Nursing Times. Net*, May, 100:40.
 25. Johansen, M. and Forberg, J. (2011): Nurses evaluation of a new formalized triage system in the emergency department: a qualitative study. *Danish Medical Bulletin*, October, 58(10): 31.
 26. Kyle, T. (2008): *Essentials of pediatric nursing*. Wolters Kluwer company, Philadelphia, 200 - 7.
 27. Daleen, A. (2010): Nurse staffing and patient outcomes in critical care: a concise review. *critical care medicine*, 38 (7): 1521-28.

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