# Discussion

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The emergency department (ED) is one of the essential hospital departments, it is the preliminary point of contact for any kind of patient who has a need for immediate interventions. ***(Ali et al., 2013)***. As ED are struggling to cope with overcrowding there is a critical need for a valid, reliable triage system in order to sort these incoming patients more rapidly and accurately. ***(Safari, 2012; Parenti et al., 2013).*** Researches suggests that, triage has a positive effect on minimizing ED waiting times and improving patients and nurse satisfaction ***(Derlet and Richards, 2008; Johansen and Forberg, 2011; El-Sayed et al., 2012)***. Triage knowledge and skills among emergency triage nurses is one of the key elements in ED. To augment the triage knowledge and skills of nurses, continuing education and training program related to triage are the key aspects in order to increase the quality care and patient safety. ***(Almada et al. , 2004; Shepherd et al., 2007; Ali et al., 2013)***. Therefore, this study was undertaken to determine the effect of implementing triage training competencies on newly graduated nurses (NGNs) working in ED at emergency hospital.

Concerning ***triage training in ED***, the results of the current study revealed that the majority of nurses' did not attend training courses regarding triage process of emergency patients. This may be due to lack of refresher conferences during employment, and unavailability of handouts to be used as a nursing guide, thus resulting in inefficient triage process, long waiting time, and decrease quality of care and patient satisfaction. This result is in agreement with findings of the study by ***Fathoni et al., (2010) ; Hegazy et al., (2010) ; Rutto et al., (2010) ; Carrion (2011)*** who found that the importance of theoretical and practical triage training to improve nurses' knowledge and skills post training sessions and consequently improve the quality of care. In this regard, ***Rahmati et al., (2013)*** reported that emergency triage nurse must have appropriate training and experience in emergency nursing triage, decision making and emergency nursing cares. ***El-Zalabany et al., (2011)*** reported that nurses should be

competent and functioning autonomously in all aspects of emergency nursing prior to undertaking triage role based upon education programs.

The current study results showed that, there were highly statistical significant difference between the study and control groups regarding ***the total mean scores of triage knowledge and practice*** of NGNs in pre, immediately and post triage training program .

***In relation to total mean score of triage knowledge,*** it was notied that there was a highly statistical significant improvement of total knowledge score among the study group as compared to the control group following program implementation. This may be due to updating of nurses' knowledge about triage in emergency care unit and increase their awareness of the importance of the triage in ED. This result is consistent with findings of the study done by ***De Lacy (2011); Miller (2011)*** who mentioned that lack of knowledge leads to inconsistencies in provision of appropriate and timely care and recommended that emergency staff should be provided with triage training to enhance level of understanding, knowledge and competence. Also, ***Ali et al., (2013)*** found that knowledge of triage among nurses is inadequate and there are learning requirements of nurses' working in ED which need to be satisfied by providing proper training and education.

In this respect, the study of ***Safari (2012)*** on the effectiveness of triage training program on knowledge and skills among health care workers revealed that, the training program improves quality of care, reduces death and increases nurses' knowledge and patients' satisfaction. ***Cone et al., (2009); Timothy and Mega (2011)*** agreed with this results as they reported that emergency triage nurse requires a broad knowledge base to provide safe and competent care to trauma patients with a variety of injuries. Also, ***Aloyce et al., (2014)*** showed that there are deficits in the triage knowledge and skills of nurses working in the in ED and emphasized the important of triage training programs to improve emergency triage nurses' knowledge and skills in triage decision making.

***Concerning triage safety knowledge***, the present study showed significant improvement of nurses' knowledge of the study group regarding triage safety in post training sessions. It may be due to updating of nurses' knowledge regarding triage safety and security. ***Fathoni et al., (2010); El-Sayed et al.,(2012)*** reported that, the emergency triage nurses required proper knowledge to improve quality of care and maintain safety of patients and nurse.

***Concerning triage process knowledge***, the current study found a lower level of nurses' knowledge of the study and control groups regarding triage process in pre program implementation. It may be attributed to lack of post graduation triage training courses which are very important in improving quality of care, and achieve better patient outcome. This finding is supported by ***Safari (2012); Rahmati et al., (2013)*** who found that triage knowledge deficit in relation to prioritizing patients and apply the category that is most appropriate to the urgency of the patient's condition.

***Regarding primary and secondary assessment knowledge***, it was found that decreased level of knowledge of the study and control groups regarding primary and secondary assessment in pre program implementation as compared to post program implementation. It may be due to lack of institutional support and time. These results are consistent with ***Salem (2006); Saleh (2007); Rominski et al., (2014)*** who stated that the lowest nurses knowledge scores were assigned regarding to primary and secondary assessment.

***Concerning total mean score of triage practice***, the present study showed that the total competency score of the study group were improved following program implementation. This may be due to proper training and evaluation of nurses' performance. These results are consistent with ***Forsman et al., (2009); Rautava et al., (2013)*** who suggested that the regular training of triage could improve skill of nurses to handle stressful work situation. In this regard, ***Considine et al., (2007)*** reported that nurses' knowledge and practice were improved post triage training sessions. In contrast to previous reports, a study

carried out by ***Abdul-Hamid, (2011)*** to determine the level of nurses' knowledge and practice regarding triage in emergency care in Ismailia university hospital mentioned that the attendance of triage training courses was not shown to have a significant effect on nurses' practice.

Triage nurse is responsible for safety of the patients and others in the waiting area. Knowledge of triage safety is essential role for the triage nurse. The present study revealed that the total mean scores for nurses' knowledge and practice of the study group were increased in post program implementation as compared to preprogram implementation. It may be attributed to increase awareness about the importance of triage safety prior to undertaking triage role. These results are consistent with ***El-Zalabany et al., (2011); Australasian College for Emergency medicine (2013)*** who mentioned that maintaining patient safety and security prior to triage assessment and treatment is essential competency for triage nurse.

Concerning the ***presence of emergency equipment***, it was noticed that there was a highly statistical significant improvement of the total mean scores of triage knowledge and practice of the study group regarding assessment of emergency equipment following program implementation as compared to the control group. It may be due to increase in the number of patients for each nurse with overloaded by more duties and having more work hours. These findings are consistent with ***Ahmed (2011)*** how emphasized that equipment used for emergency situations should be available for use and placed in a designated location that is accessible to all emergency nursing personnel.

Assessment of environmental hazards, is the first step to safe practice at triage. The current study showed, decrease in the level of triage knowledge and practice of study and control groups regarding environmental hazards assessment immediately program implementation. There were highly statistically significant improvement of nurses' knowledge and practice in post program implementation. This may be due to lack of time and overlapping of nursing activities because the

emergency triage nurse may be responsible for many patients at the same time. This is in the line with ***Hoyt and Thomas (2007); Louis et al., (2008); Gerdtz and palmer (2009)*** reported that assessment of environmental hazard is the first step to safe practice at triage. Also, ***Australasian College for Emergency medicine (2013)*** stressed that the triage environment must be safe for both patient and nurse and non-threatening physical environment.

***Concerning universal standard precautions***, the current study showed lower level of triage knowledge and practice of the study and control groups regarding universal standard precautions in pre program implementation. While, there were highly statistically significant improvement of nurses' knowledge and practice immediately program implementation. It may be attributed to lack of their knowledge and inadequate available amount of equipments and supplies needed for applying universal standard precautions. This result is in agreement with findings of the study by ***Tantawy (2004)*** who mentioned that the application of infection control, fire safety and electrical safety which are very important points in nursing care. In this regard, ***Jane (2003) ;Timby and Smith (2003)*** stated that cleaning, disinfection, sterilization of equipment, control of contaminants, application of standard precautions and aseptic practice are basic competency to an effective infection control program that helps to protect patients and staff. ***Ahmed (2007)*** stressed that presence of written guidelines for infection control is important aspect for the emergency unit and should be available and known to all nursing personnel. Moreover, ***Mahmoud (2007)*** found, in his study, that all resources for infection control must be available in each unit. This is very important to keep the patient safety and serve a high competent care.

***In relation to triage process,*** the current study found that poor level of nurses' knowledge and practice of the study and control groups regarding triage process in pre program implementation. While increase the total competency level of the study group following program implementation. It may be due to lack of triage training courses that were conducted in hospitals, and not all nurses

are included. This finding is supported by ***Safari (2012) ; Rahmati et al., (2013)*** who found that knowledge deficit about patients categorization according to their urgency as resuscitation, emergency, urgent, semi urgent or non-urgent categories. This result is consistent with ***Fathoni et al., (2010)*** who emphasized that continuing education and training courses related to triage process among emergency nurses should be provided for them to improve their knowledge and skills and allow emergency nurses to conduct triage tasks more effectively, thus resulting in better patient outcomes and enhancing the quality of emergency care and patient safety.

In addition, ***Roukema et al., (2006); Schrijvers (2008), Croskerry et al., (2009), Acosta et al., (2012), Kuhn et al., (2014)*** they raised a concern of the need for a system that prioritizes patients in the order of urgency. In the same line ***Lee (2010); Lerner et al., (2010); Hoffman (2012); Aboneh (2013)*** agreed with these results who mentioned that triage is an important tool to classify the clinical priority of the patients presenting at ED on the basis of illness, injury severity and need for medical and nursing care and regulating patients flow through ED, and determining the most appropriate area for treatment and provide ongoing assessment of patients and documentation of findings.

***Concerning triage assessment time,*** the present study found a poor level of nurses' knowledge and practice of study and control groups about triage assessment time in pre program implementation as compared to immediately program implementation. This may be due to lack of awareness and high workload especially when the ED was occupied to its full capacity. This result was in accordance with ***Aloyce et al., (2014); Rominski et al., (2014)*** who found that lacking knowledge on triage assessment time can potentially result in harmful delays in rendering timely emergency care and increase the risk of avoidable deaths and disabilities and ensure that each patient is treated in the order of clinical urgency and that the treatment is appropriate and timely.

***Regarding triage reassessment, it*** was observed during the present study that the lower level of triage knowledge and practice of study and control groups regarding triage reassessment in pre program implementation. There were highly statistically significant improvement of nurses' knowledge and practice regarding triage reassessment immediately program implementation. It may be due to lack of time and shortage of triage nurses to reassess emergency patients regularly. These results are in accordance with ***Aloyce et al., (2014)*** *and* ***Ropert (2010)*** who found that no reassessment on regular basis of emergency patients after triaging to determine if the conditions of the patients had deteriorated and need to be seen more urgently.

***Concerning triage documentation,*** it was noticed that there was a highly statistical significant improvement of total mean score of triage knowledge and practice of the study group regarding triage documentation immediately triage training program. It may be due to increase in their awareness of the importance of triage documentation in ED. This result is supported by ***Gerdtz and Palmer, (2009); Harding et al, (2013); Parenti et al., (2013)*** who emphasized that triage documentation is essential practical competency for triage nurse and should include the following data: the patient's age and gender, original nurse's triage category, presenting complaint, mode and time of arrival, past diseases, vital signs and pain score.

***Regarding critical look,*** it was found during the present study the level of nurses' triage knowledge and practice of the study group regarding to critical look were improved following program implementation. It may be attributed to increase of awareness of the importance of critical look of emergency patients and providing information on triage algorism related to triage process. This finding is consistent with ***Molyneux et al., (2005); Warren et al, (2008); Jelinek et al., (2009); Wyer et al, (2011)*** who reported that an experienced triage nurse can take one look at a patient and, based on general appearance, assessment airway, work of breathing, circulation and decide whether immediate care is required.

***In relation to primary assessment,*** the current study showed that the lower level of triage knowledge and practice of study and control groups regarding primary assessment in pre program implementation. There were highly statistically significant improvement of the study group of nurses' knowledge and practice immediately program implementation. It may be due to deficiency in their education as well as lack of in service training about primary assessment. This finding is consistent with ***Salem (2006)*** who stated that the lowest scores for triage nurse were assigned regarding to primary assessment. ***Wilson (2008); Middleton (2010); Miller (2011); Sammons (2012),*** added in their studies that the all items of primary assessment (airway, breathing, circulation, disability, and exposure) as essential nurses' competencies.

***Concerning opening airway and resuscitation procedures,*** it was noticed decrease level of triage knowledge and practice of study group regarding opening airway in pre program implementation. There were highly statistical significant difference following program implementation. It may be due to inadequate facilities and equipment needed for applying resuscitation procedures. This result is in agreement with findings of the study by ***Salem (2006)*** who reported that more than half of nurses demonstrated poor level of competency in resuscitation procedures.

***Regarding assessment of the level of consciousness,*** it was noticed that there was a highly statistical significant improvement of triage knowledge and practice score regarding neurological assessment among the study group following program implementation. This may be due to updating their knowledge and enhancing their practice. This result is consistent with findings of the study by ***Abdul-Hamid, (2011)*** who reported that the majority of nurses didn't assess the level of consciousness as a part of the primary assessment of triage.

***Concerning vital signs,*** it was found throughout the study a lower level of triage knowledge and practice of study group regarding assessment of vital signs in the pre program implementation. While there is increase in the total competent

level of the study group following program implementation. The difference in relation to obtaining vital signs is highly significant. This may be related to busy units, inadequate staffing, and increased number of patients in ED. This results is consistent with ***Salem (2006)*** who reported that the majority of nurses demonstrated poor level of competency regarding measuring vital signs. Also, ***Mc Bride et al., (2005) ; Hogan, (2006)*** who stated that the respiratory rate is one of the vital signs that has been neglected by health care provider despites its vitalness in determining life threatening patients.

In contrast to previous reports and the results of the present study, ***Molyneux et al., (2005); Rominski et al., (2014)*** stated that the majority of nurses were competent in measuring and recording vital signs once the patient arrives at ED.

***In relation to pain assessment,*** throughout the study it was observed lack of pain assessment of the study group in the pre program implementation and increase in the total competency level of the study group following program implementation. The difference in relation to pain assessment is highly significant. This may be related to inadequate pain assessment knowledge and skills. This result is in agreement with findings of the study by ***Ropert (2010)***, who found that pain assessment and treatment by health care professional in ED receive little attention.

***As regards to secondary assessment*** **(**head to toe assessment**)**, the current study found that there was a highly statistical significant improvement of total mean score of triage knowledge and practice of the study group regarding secondary assessment immediately triage training program. This may be related to attended refreshing courses and continuous in-service training programs. This result is consistent with ***Jones (2009); Brown (2011)*** who reported that the majority of emergency nurses had competent performance regarding head to toe assessment. Also, this finding is in contrast with ***Salem (2006)*** who found that poor level of competency of emergency nurses regarding secondary assessment.

Effective communication is essential in enhancing the effectiveness and accuracy of the triage process. It was observed that the lower level of triage knowledge and practice of study group regarding communication skills in the pre program implementation. While increase in the total competency score of the study group following program implementation. This may be due to lack of communication skills between health care provider. This result is supported by ***Ahmed (2011)*** who found that the majority of the study nurses in ED were incompetent in performing communication process. Also, ***Othman (2008)*** stated that the majority of nurses didn't offer time to communicate with conscious patients nor select the proper way for communication properly. This finding is contradict with ***Mahmoud (2007); Saker (2007)*** reported that the majority of nurses demonstrated good scores in their performance regarding communication process in ED.

In the same line**, *Hood and Leddy, (2003); Mc Cabe and Thimmins, (2013)*** added that the nurse in ED should have the ability to reassure the patient and his/her family by providing the needed information which answers their questions and concerns effectively. Also, ***Ahmed (2004)*** found that establishing communication with patients is a dimension of care which should be used in order to alleviate some of the patients concerns regardless of the severity of their conditions. In addition, ***Mansour (2010)*** emphasized the importance of given the patients opportunity to get clarifications for unclear information, to speak with the staff, and to express feelings.

Similarly, ***Hegazy et al., (2010); Aacharya et al., (2011)*** found that the ability of triage nurse to communicate effectively is important to establish trust with patient and significant others. Also, ***Aronsky et al., (2008)*** stated that good communication within the ED is essential to provide timely and high quality patient care. ***Petruniak (2013)*** added that communication barriers complicate the triage process and may contribute to ED nurse triage decisions.

In addition, effective communication between the patient and nurse requires the nurse to keep eye contact and use appropriate facial expressions during communication. In the current study, it seems that the communication between patients and nurses was very effective following program implementation. This in line with ***Happ et al (2004) ; Ebara et al (2006), Mast (2007); Abd- Elakder (2013)*** found that eye contact and facial expression were considered as important elements for establishing and maintaining of effective communication between patients and nurses, and improving patient outcome. Also ***Mc Cabe and Timmins, (2013)*** stated that communication skills, such as, listening and body language are very powerful communication strategy used in developing a trusting relationship with patient.