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Integrating High Fidelity Simulation with Patient Assessment Using International Trauma Life Support (ITLS) Protocols for Prehospital Scenarios amongst Emergency Medical Services (EMS) Students of Pune, India

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Abstract

Introduction: Prehospital settings are frequently associated with a high degree of mortality and are challenging situations for training purposes. Assessment of the critically ill-injured patients needs to be both accurate and timely. This can significantly improve the chances of survival of the patients. The ITLS patient assessment protocol is a valid and reliable assessment tool for trauma emergencies. The study attempts to integrate high fidelity simulation with trauma assessment using ITLS patient assessment protocol.

Objective: To utilize High fidelity Simulation to assess the preparedness of EMS students in executing ITLS patient assessment protocol.

Methodology: 80 students of Post Graduate Diploma in Emergency Medical Services (PGDEMS) participated in High fidelity simulation scenarios for patient assessment using ITLS Protocols. A high fidelity manikin METIMAN was programmed for running clinical scenarios. On the day of Simulation, Twelve groups of seven students each performed one simulated clinical scenario and were evaluated using patient assessment protocol checklist of ITLS.Each simulation session lasted for 10 minutes each followed by a structured debriefing for 20 minutes. The entire simulation session was video recorded with consent of the students.

Conclusion: The study concludes that there should be proper understanding and knowledge regarding when to apply the cervical stabilization and need for more hands on practice for critical life threatening emergencies using High fidelity simulation manikins.

Keywords: *High fidelity Simulation, ITLS, patient Assessment, Prehospital management, Emergency medical Services.*

Introduction

EMS is defined as a system that organizes all aspects of care provided to patient in prehospital or out of hospital environment.[1]

The Post Graduate Diploma in Emergency Medical Services (PGDEMS) program trains medical professionals in the basics of Emergency medical Services inclusive of Basic Life Support, Airway Management, Intubation Techniques, Cardiac Case scenarios, Arrythmia recognition, Emergency drugs, use of Defibrillator, Spinal Immobilization, triage and other life saving skills.

Prehospital settings are frequently associated with a high degree of mortality and are challenging situations for training purposes.[2] Prehospital management has to ascertain initial treatment strategies and be priority Oriented[3].Providing training to EMS students in real life prehospital setting is challenging to unstable patients[2].

It is therefore rational to use high fidelity simulation to train EMS students for real prehospital events through

scenario dynamics and limited realism.[4]

Simulation facilitates both the initial learning and deliberate practice in the management of critical emergency scenarios.[2] A study in 2007 by Berkendanst[5] *etal* described the possible roles of simulated patients, skill trainers, computerized patient simulators and web based teaching in trauma training.

Assessment of the critically ill-injured patients needs to be both accurate and timely. This can significantly improve the chances of survival of the patients.

It is very difficult to assess the performance of the EMS students in a real life emergency due to paucity of time and prioritization towards saving the patient. Simulation offers an excellent alternative for objective assessment of the ITLS protocol and can be administered in a safe environment.

A study by Christine[6] *etal* has conclusively shown that trauma simulation training increases confidence levels in prehospital personnel performing lifesaving intervention in trauma patient.

The ITLS patient assessment protocol is a valid and reliable assessment tool for trauma emergencies.

The study attempts to integrate high fidelity simulation with trauma assessment using ITLS patient assessment protocol.

Objective:

To utilize High fidelity Simulation to assess the preparedness of EMS students in executing ITLS patient assessment protocol.

Methodology

80 students of Post Graduate Diploma in Emergency Medical Services (PGDEMS) participated in High fidelity simulation scenarios for patient assessment using ITLS Protocols. . The students were briefed regarding ITLS Patient assessment protocol through didactic lectures and videos in the week preceding to the session.

A high fidelity manikin METIMAN was programmed for running clinical scenarios. The topics covered included Hemorrhagic Shock following Trauma, Tension Pneumothorax, Head Injury and Cardiogenic Shock.

On the day of Simulation, Twelve groups of seven students each performed one simulated clinical scenario and were evaluated using patient assessment protocol checklist of ITLS.

Each simulation session lasted for 10 minutes each followed by a structured debriefing for 20 minutes.

The entire simulation session was video recorded with consent of the students.

The videos were reviewed by two simulation educators to avoid bias and scored using ITLS checklist consisting of 9 items which formed the Primary Survey.

The participants were awarded 1 point for performing the action as per ITLS patient assessment checklist and the maximum possible score was 9 thus evaluating their adherence to ITLS patient assessment protocol.

Result

Table 1. Patient Assessment as per ITLS Protocol

KEY: Y indicates critical actions performed as per ITLS protocol

N indicates the critical actions not performed as per ITLS protocol

Critical Action	Group											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Scene Size Up	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

***Cont...* Table 1. Patient Assessment as per ITLS Protocol**

General Impression	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N
Level of Consciousness	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Manual Inline Stabilization	N	Y	Y	N	N	N	N	Y	N	N	N	N
Initial Assessment -Airway	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Initial Assessment -Breathing	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Initial Assessment -Circulation	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Rapid Trauma Assessment	Y	y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
Cervical Collar Applied After Neck Examination	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Total Score out of 9	6/9	8/9	9/9	8/9	4/9	8/9	6/9	9/9	6/9	7/9	7/9	6/9

Table no. 1 describes the adherence of the participants to the critical actions required to be performed as part of the patient assessment.

All twelve groups assessed the scene safety, mechanism of injury, and Level of Consciousness, which could point towards multiple life threatening injuries.

Eleven Groups performed the Initial Assessment accurately, which includes immediate recognition and management of life threatening injuries related to Airway, Breathing and Circulation.

Ten Groups performed Rapid Trauma Assessment after completing the initial assessment in which they did complete Head to Toe examination of the patient and came to a correct diagnosis.

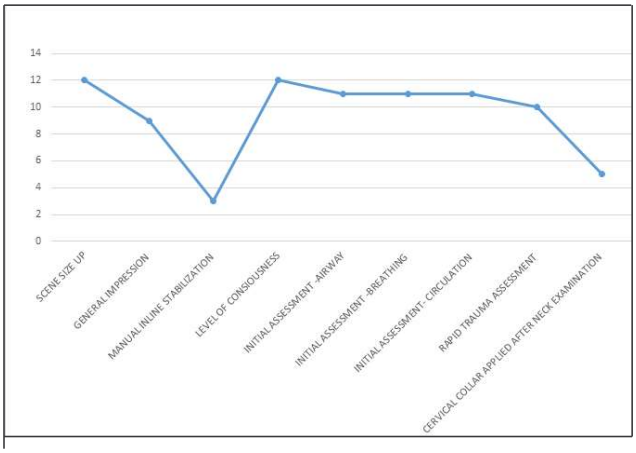

Figure 1

As shown in Figure 1. Significant dip in adherence is seen in performance of Manual Inline Stabilization, which was performed only by 3 groups out of 12 and in application of Cervical Collar which was performed by only 5 groups.

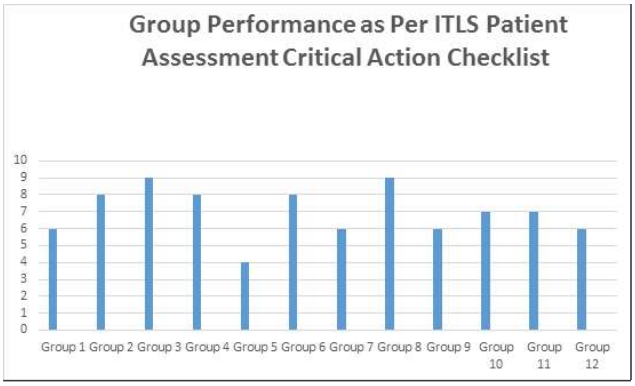

Figure 2

Figure 2. Depicts each group's performance in terms of performing the critical action during patient assessment.

The highest score obtained is 9/9.

The lowest score obtained is 4/9

Discussion

The participants in the study were briefed through traditional lectures and Videos regarding the ITLS patient Assessment protocol. Yet when confronted with a realistic simulation scenario on a high fidelity manikin, only two groups out of twelve were able to perform all

the steps of the ITLS checklist.

An objective assessment of the critical action performance showed that the students failed to provide appropriate manual inline stabilization as well as application of cervical collar after neck examination.

The early management of a patient with a potential cervical spinal cord injury begins at the scene of the accident. Since there is no other way of confirming cervical injury, in cases of significant mechanism of injury, potential cervical spinal injuries must be anticipated and cervical immobilization should be done. If the patient is not transported in a correct manner, neurologic function may be impaired. So cervical spinal immobilization becomes a critical aspect of patient assessment protocol.

This emphasizes the fact that there should be proper understanding and knowledge regarding when to apply the cervical stabilization and need for more hands on practice for critical life threatening emergencies using High fidelity simulation manikins.

It was encouraging that most groups performed the assessment of Airway, Breathing and Circulation accurately and meticulously. They also successfully completed the sizing up of scene and rapid trauma assessment.

High fidelity simulation offers the opportunity to observe and critically appraise the students during their training period. The debriefing examines the reasons behind noncompliance to assessment protocols thereby improving the performance of the students in real clinical situations.

Rigorous adherence to the patient assessment protocol significantly improve patient outcomes. Hence, High fidelity simulation should be utilized for evaluating and improving student performance.

Conclusion

Though participants performed the initial assessment accurately and managed the scenarios as per ITLS protocol, they were lacking in the knowledge of when to apply the skills component.

The study concludes that there should be proper understanding and knowledge regarding when to apply the cervical stabilization and need for more hands on practice for critical life threatening emergencies using High fidelity simulation manikins.

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