Original Research Article

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Impact of a short-term training in emergency and trauma in a tertiary teaching institute

Rudramani¹, Vineet Kumar², Neha Thakur³, Vikas Singh^{1*}, Shobhit Shakya⁴, Neetu Singh⁵, Soumya S. Nath⁶, Richa Choudhary⁷, Anamika Chandra⁸, Amrita Lumbani⁹

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*Correspondence:

Dr. Vikas Singh,

E-mail: drvikas_singh@yahoo.com

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ABSTRACT

Background: The health-workers working in emergency area need better training to handle emergency patients with sincerity and accurate clinical skills. So, it is imperative to train them on simulation models and prepare them to perform their duties with better skills and higher confidence.

Methods: A structured course named as Dr. RMLIMS Emergency and Trauma-Basic Course (DrRMLIMS ET-BC), was designed to effectively train the resident doctors from different departments, nursing staff (pool A) and other healthworkers, ancillary staff and security persons (pool B) posted in the casualty and emergency wards. Pool A underwent pretest to ascertain basic knowledge. Post-test questionnaire was taken after training. Predesigned google forms were used for feedback. Pool B underwent counselling and motivating sessions about the sense of team, role of leader and effective communication. Direct observation, officer in-charge's feedback, buddy feedbacks, patient's attendants' feedbacks and self-appraisal were done for evaluation. Paired t test was applied on pool A pretest and post-test scores to evaluate the change in the knowledge.

Results: Pool A shows a pre-test mean of 37.83±0.92 (approximately 39%) which improved significantly to 72.16±0.90 post training (p value=0.0000). Pool B revealed significant positive change in the attitude, behavior and sense of team and responsibility.

Conclusions: This study shows that this training is an adequate training programme to teach the basics emergency and trauma skills and been successful in increasing knowledge, despite the variations in the vision of different subject specialities.

Keywords: Emergency, Trauma training, Capacity building

INTRODUCTION

The residents and health-workers working in Emergency area need better training to handle emergency patients with utmost sincerity and accurate clinical skills. There has been increasing interest in developing interdisciplinary teams in the emergency that actively involve health care professionals as they possess a diverse range of highly

trained skills that can help to speed up and enhance the patients' throughput.¹

To achieve the same, it is imperative to train them on simulation models (manikins) and prepare them to perform their duties with higher confidence and better skills. Trauma cases comprises the major input of patients in any casualty department. To handle these patients, team work

¹Department of General Surgery, ²Department of Orthopedics, ³Department of Pediatrics, ⁴Department of Medicine,

⁵Department of Obstetrics and Gynaecology, ⁶Department of Anaesthesia, ⁷Department of Forensic Medicine,

⁸Department of Community Medicine, ⁹Department of Physiology, Dr. Ram Manohar Lohia Institute of Medical sciences, Lucknow, Uttar Pradesh, India

between different speciality residents and nursing staff is mandatory. Also, our ward attendants, sanitation workers and security personnel play an important role in managing these patients effectively.

Various studies has proven that team performance is dependent not only on technical but nontechnical skills (teamwork, leadership, and task management) as well.²⁻⁴ Clinical experience alone has not been associated with improved team performance; therefore, training programs are focusing on team dynamics during medical crises as a point of improvement.

METHODS

For the same purpose and capacity building, a structured course was designed to effectively train the resident doctors, nursing staff and other health-workers posted in the casualty and emergency wards providing Emergency services. The course was named as Dr. RMLIMS Emergency and Trauma-Basic Course (Dr. RMLIMS ET-BC).

Course settings

- EMOs, Resident doctors (senior and junior), Hospital Administration residents, Technicians and Nursing staff posted in Casualty and Emergency wards comprised Pool A.
- Ward boys, sanitation staff and security guards posted in Casualty and Emergency wards comprised Pool B.
- The hands-on mandatory training of one and half days for Pool A and half a day for Pool B candidates.
- In each course, 30 candidates from Pool A and 20 candidates from Pool B joined the training.
- Pre-test questionnaire to be completed before the course.
- Post-test questionnaire to be taken by all candidates.
 75% marks in post-test was mandatory to be successful

The training was conducted under the guidance of corresponding author who is an ATLS Course Director and Emergency Incharge with the support from faculties from various broad specialities as Master Trainer of NASG, Obstetrics & Gynaecology, Forensic Medicine and Toxicology, BLS & ACLS Instructor, PALS & ATLS Provider, Anaesthesiology, ATLS Instructor, Paediatric Emergency Expert, Paediatrics, ATLS Provider, Orthopaedics, ATLS Instructor, General Surgery and from General Medicine.

Course content-interactive discussion topics

Pool A

- ATLS protocols
- Medical Emergencies: Basic ManagementPaediatric Emergencies: Basic Management

- Medico-legal guidance
- Haemorrhagic shock in Obstetrics
- Ethics and Counselling

Pool B

- Supportive Role of Ancillary Staff
- Armamentarium check-up
- Patient Shifting
- Security protocols

Skill stations

- 1) Airway
 - Adult and Paediatric
 - Cricothyroidotomy- needle & surgical
- 2) Breathing
 - Needle decompression/ ICD insertion
 - Helmet removal
 - Cervical collar application
- 3) Circulation-1
 - Haemorrhage control
 - Venous access
- 4) Circulation -2
 - Pelvic stabilization
 - Splintage
 - Log roll
- 5) Circulation -3
 - 4 T demonstration
 - Balloon Tamponade
 - NASG
- 6) Disability
 - GCS scoring
 - Ryle's tube insertion
 - Catheter insertion
- 7) Medicolegal Documentation
 - Taking a sample in poisoning
 - Documenting injuries
 - Foreign body retrieval protocols

CPR skills

Pretest (as MCQs) was taken by all the candidates of pool A at the time of registration and evaluated during the course to ascertain their basic knowledge. Post-test questionnaire was taken by all the candidates of pool A at

the end of the course. Feedback regarding the course was received with the help of predesigned google forms which were circulated among the candidates after 3 months of their respective courses.

Table 1: Course time table.

Course time table
Day 1: pool A
Introduction and course overview
ATLS: primary survey
ATLS: secondary survey
Medical emergencies: basics
Paediatric emergencies: basics
Basics of CPR
Lunch
Airway
Breathing
Circulation 1
CPR
Pre-test discussion
Day 1 closure and faculty meeting
Day 2: pool A
Medicolegal aspects in emergency
Haemorrhagic shock in obstetrics
Circulation-2
Circulation-3
Medicolegal documentation
Day 2: pool B
Welcome, introduction and course orientation for pool
В
Supportive role of ancillary staff
Patient shifting: protocols and ways
Armamentarium check-up
Security protocols and closure
Post-test pool B

Pool B was delivered with well-organized lectures on the roles and responsibilities, patient shifting protocols, security protocols and armamentarium checkup *viz*. monitors and attachments, suction, trauma trolley functioning. Counselling and motivating sessions were carried about the sense of team, role of leader and effective communication.

Participant selection

Total of 100 participants attended the training course collectively in two courses. 60 candidates in pool A and 40 candidates in pool B.

Candidates in pool A came from various broad specialities including general surgery, general medicine, emergency medicine, orthopaedics, pediatrics, obstetrics and gynaecology, nursing staff and emergency technicians. Pool B comprised of ward boys, sanitation staff and security guards posted in casualty and emergency wards (Table 2).

Study period

The present study was conducted from January 2021 to May 2021.

Data analysis

Data variables collected included basic participant demographics, pre-test and post-test scores and course evaluation survey responses.

STATA version 13 software was used for the statistical analysis.

Analysis of variance (ANOVA) and paired t-test was used to assess the pre-test/post-test difference among the groups and evaluate the changes in the candidates' mean test scores before and after training respectively.

Table 2: Distribution of candidates in pool A and pool B.

S. no.	Department	Academic resident (DNB trainee+senior residents)	Non-academic resident (post MBBS)
1	General medicine	3	5
2	General surgery	3	5
3	Orthopaedics	3	3
4	Paediatrics	3	3
5	Obstetrics and gynaecology	3	5
6	Emergency medicine	0	10
7	Emergency medical officer	4	
8	Nursing staff	8	
9	Emergency technicians	2	
10	Pool B	40	

RESULTS

ANOVA evaluation revealed that there was a significant difference (p value=0.0000) in the knowledge (based on pretest) among the various departments as a group in Pool A, before the commencement of the training. Comparison of pre-test by Bonferroni clearly depicts diversity in the same (Figure 1).

Paired t-test was applied to compare if there was any difference between the pre-test and post-test (data is difference of means±standard error).

The overall evaluation of pool A shows a pre-test mean of 37.83±0.92 (approximately 39%) revealing a low level of knowledge) which improved significantly to 72.16±0.90 post training (p value=0.0000).

All the departments were evaluated individually too. Department of surgery, orthopaedics, emergency medicine, internal medicine and EMOs scored higher though differences were there. All of them revealed a significantly improved outcome (p value <0.0001) (Table 3).

Post-test ANOVA shows again differences between the departments, but Bonferroni depicts the significant decrease in the disparity distribution of the scores among the department. All the participants achieved more or less, same level of knowledge, though some statistical differences were there (Figure 2).

The pool B underwent direct observation evaluation in the successive one month about the application of the principles delivered during training. The officer in-charge, buddy feedbacks and patient's attendants' feedbacks were also evaluated. Simultaneously self-appraisal was also accounted. It revealed significant positive change in the attitude, behavior and sense of team and responsibility. Compassion and confidence were also increased.

		Comparison		by varl		
		(B	onferroni)			
Row Mean- Col Mean	EM	EMO	ET	GM	GS	NS
EMO	-1.6 1.000					
ET	-9.6	-8				
au	0.106	0.860	9.5			
GM	1.000	1.000	0.138			
GS	0.000	11.75	19.75	10.25		
NS	-9.6 0.000	-8 0.065	1.000	-9.5 0.001	-19.75 0.000	
OBG	-6.6 0.034	-5 1.000	3 1.000	-6.5 0.068	-16.75 0.000	3 1.000
Ortho	1.73333	3.33333	11.3333	1.83333	-8.41667 0.009	11.3333
Ped	-6.93333 0.050	-5.33333 1.000	2.66667	-6.83333 0.088	-17.0833	2.66667
Row Mean- Col Mean	OBG	Ortho				
Ortho	8.33333					
Ped	333333 1.000	-8.66667 0.015				

Figure 1: Distribution of pretest knowledge difference between different departments.

EMO-emergency medical officer, ET-emergency technician, GM-general medicine, GS-general surgery, NS-nursing staff, OBG-obstetrics and gynaecology, ortho-orthopedics, ped-pediatrics (p value <0.05 in yellow box)

Table 3: Participant test scores and analysis (scores were out of 100).

G		N C	Paired t-test		
S.	Department	No. of participants	Pre-test	Post-test	P value
no.		par ticipants	Mean±S.E.	Mean±S.E.	
1	General medicine	8	39.50±1.18	73.50±1.5	0.0000
2	General surgery	8	49.75±0.59	81.50±2.38	0.0000
3	Orthopaedics	6	41.33±1.68	76.00±1.78	0.0000
4	Paediatrics	6	32.66±1.22	67.33±2.40	0.0000
5	Obstetrics and gynaecology	8	33.00±1.81	65.00±1.81	0.0000
6	Emergency medicine	10	39.60±1.51	72.80±1.55	0.0000
7	EMO	4	38.00±2.58	71.50±3.09	0.0001
8	Nursing staff	8	30.00±1.30	69.50±1.99	0.0000
9	Emergency technicians	2	30.00±2.00	70.00±2.00	NA
	Total	60	37.83±0.92	72.16±0.90	0.0000

			of post te: Bonferroni)	st by vari		
Row Mean-		C	Bonierroni)			
Col Mean	EM	EMO	ET	GM	GS	NS
EMO	-1.3					
	1.000					
ET	-2.8	-1.5				
	1.000	1.000				
GM	.7	2	3.5			
	1.000	1.000	1.000			
GS	8.7	10	11.5	8		
	0.044	0.130	0.322	0.154		
NS	-3.3	-2	5	-4	-12	
	1.000	1.000	1.000	1.000	0.001	
OBG	-7.8	-6.5	-5	-8.5	-16.5	-4.5
	0.122	1.000	1.000	0.091	0.000	1.000
Ortho	3.2	4.5	6	2.5	-5.5	6.5
	1.000	1.000	1.000	1.000	1.000	1.000
Ped				-6.16667	A CONTRACTOR OF THE PARTY OF TH	-2.16667
L	1.000	1.000	1.000	1.000	0.000	1.000
Row Mean-						
Col Mean	OBG	Ortho				
Ortho	11					
	0.014					
Ped	2.33333	-8.66667				
	1.000	0.255				

Figure 2: Distribution of post-test knowledge difference between different departments.

EMO-emergency medical officer, ET-emergency technician, GM-general medicine, GS-general surgery, NS-nursing staff, OBG-obstetrics and gynaecology, ortho-orthopedics, ped-pediatrics (p value <0.05 in yellow box)

DISCUSSION

In the setting of the study institution, the first responder team to emergency and trauma is constituted by health personnel from various level of academics and skill proficiency. It is mandatory for the serving team to have a sense of team membership and effective communication with sound knowledge of the situation, the necessities, caliber of the team and equal proficiency in the initial management of such patients.

A quickly constructed specialty team with unstable membership, will not transform naturally into an expert trauma team. The creation and maintenance of effective trauma teams requires training strategies such as multidisciplinary simulation that target team training and team interaction. Specifically, training should focus on developing non-technical skills for resuscitation trauma teams that have to form quickly and function effectively, often having never met before.⁵

Table 4: Feedback ratings by participants.

Score				1		2	3		4	5
How do you rate the length of the course for learning the material						0	3		14	43
						-	0.	.05%	23.33%	71.66%
How setisfied one was with this are and half day course				0		0	3		20	37
How satisfied are you with this one and half day course						-	0.	.05%	33.33%	61.66%
Please mark according to the value of what you learned						0	0		25	35
in the course						-	-		41.66%	58.33%
Score	1	2	3	4	5	6	7	8	9	10
How likely will you be to recommend	0	0	0	0	3	3	0	9	11	34
this course to your colleague			-	0.05%	0.05%	-	15.00%	18.33%	56.66%	
Considering the usefulness of this course how would you rate it		0	0	0	0	3	0	5	14	38
		-	-	-	-	0.05%	-	08.33%	23.33%	63.33%

Any miscommunication or lacunae acts as the 'rate limiting step' to the immediate necessary measures, causing delay in the effective resuscitative/ treatment measures in the initial life-saving hour, the 'golden hour'.

Even the transfer protocols, the crowd management, onsite sanitation services and resource management at need, affects the outcome tremendously. The author expected various short term and long-term outcomes by implementation of this training course.

Effectiveness of short-term training

The short-term training done was founds to have dramatic improvement in knowledge as reflected by the post test score and simultaneously the participants felt much confident about it. Emergency and trauma management needs a multidisciplinary approach. Usually, the skills and procedures are taught by silo method that more experienced members pass the skills to youngers only in their field, which restricts their exposure to comprehensive approach.⁶

The comprehensive approach from various departments at a common platform made a better understanding and built the guts to combat the challenges posed by different clinical situations. Though the lectures increase the knowledge but the inclusion of the hands on training increases the psychomotor reflexes and skills, thus better outcomes. It has been equally suggested by The national stop the bleed (STB) campaign implemented in 2015 to provide haemorrhage control education to non-medical providers. Participants who engaged in hands-on practice for tourniquet and wound packing were more proficient than those who only saw the lecture. 7 Similarly Ghazali et al did a randomized controlled trial design was conducted in ten emergency department of public hospitals, to identify the effect of triage training on the skills and accuracy of triage decisions for adult trauma patients and found a significant effect on the skill of triage and accuracy of triage decisions.8 Kristiansen et al studied the implementation of trauma team training (TTT), the median total processing time was reduced from 62 minutes to 57

minutes until transfer to a ward or an operating theatre (p>0.05), and 75% of all trauma cases were handled within 75 minutes compared with 105 minutes before TTT (p>0.05). 9

During the pre-test the general surgery, orthopaedics, emergency medicine and general medicine members scored higher probably due to repeated exposures to manage such patients during their duties and helping each other during the situations. The limited access of the gynaecology and paediatrics residents to a common emergency, due to less number of patients of concerned speciality was found to have a confounding factor for the smaller scores among them. Nursing staff and emergency technicians scored a less because of loss of interest, because of feeling subordinate and lack of confidence. But the training effectively increased the scores of all the groups and improvement more than double in all the groups, and decreased the disparity in the true scores as well. It shows that a meticulously designed short course training and approach can achieve a targeted goal in a short time, though revisions are necessary.

With the increasing incidences of aggressive and violent environment in the emergencies, it's been suggested by various studies that the security interventions must be done and documented in the clinical notes of the patients. ^{10,11} But along with the documentation a tactical and compassionate handling is an utmost need of the time. The training was successful to aware the ancillary staff and security persons about their roles and responsibility and they felt more confident and were well recognised as a team member post-training.

The evaluation revealed significant improvement (by feedback and self-appraisal response) in the performance and behaviour toward their duties.

Participants' feedback

On a scale of 5 the participants were very much satisfied with the length of the course (71.67%) and value of the material learned (58.33%), nearly all rest graded it 4.

63.33% participants rated it highly useful and 56.67% wished to recommend this to their colleagues (majority rated it on higher side) (Table 4).

Limitations

Though the training was found to increase the objective knowledge and skill confidence of the candidates, no directly observed scoring was done on live patients and its outcome, in the pool A. No third party expert evaluation was done either.

CONCLUSION

This study shows that this training is an adequate training programme to teach the basics emergency and trauma skills and been successful in increasing the practical oriented knowledge, despite the variations in the vision of different subject specialities. A comprehensive approach as this platform provided, will definitely help in the coordination and thus improved patient outcome. Yet, the capacity building is a continuous process and requires more number of such structured courses' training like ATLS, ACLS and PALS. For better implementation, routine mock drills and direct observation of procedural skills (DOPS) is a better modality.

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Institutional Ethics Committee

REFERENCES

- Saxon RL, Gray MA, Oprescu FI. Extended roles for allied health professionals: an updated systematic review of the evidence. J Multidiscip Healthc. 2014;7:479-88.
- 2. Cooper S, O'Carroll J, Jenkin A, Badger B. Collaborative practices in unscheduled emergency care: role and impact of the emergency care practitioner—quantitative findings. Emerg Med J. 2007;24(9):630-3.
- 3. Ummenhofer W, Amsler F, Sutter PM, Martina B, Martin J, Scheidegger D. Team performance in the emergency room: assessment of inter-disciplinary attitudes. Resuscitation. 2001;49(1):39-46.

- Pennington KM, Dong Y, Coville HH, Wang B, Gajic O, Kelm DJ. Evaluation of TEAM dynamics before and after remote simulation training utilizing CERTAIN platform. Med Educ Online. 2018;23(1):1485431.
- 5. Murphy M, McCloughen A, Curtis K. The impact of simulated multidisciplinary Trauma Team Training on team performance: A qualitative study. Australas Emerg Care. 2019;22(1):1-7.
- Kunac A, King NA, Ostrovsky I, Rytzarev D, Merchant AM, Murano T. The Impact of Interdisciplinary Education on Skills and Attitudes of Surgery and Emergency Medicine Residents. Surg J N Y N. 2019;5(1):18-24.
- Zwislewski A, Nanassy AD, Meyer LK, Scantling D, Jankowski MA, Blinstrub G, et al. Practice makes perfect: The impact of Stop the Bleed training on hemorrhage control knowledge, wound packing, and tourniquet application in the workplace. Injury. 2019;50(4):864-8.
- Ghazali SA, Abdullah KL, Moy FM, Ahmad R, Hussin EOD. The impact of adult trauma triage training on decision-making skills and accuracy of triage decision at emergency departments in Malaysia: A randomized control trial. Int Emerg Nurs. 2020;51:100889.
- 9. Kristiansen LH, Freund DS, Rölfing JHD, Thorninger R. Trauma team training at a "high-risk, low-incidence" hospital. 2020;5.
- 10. Mitra B, Nikathil S, Gocentas R, Symons E, O'Reilly G, Olaussen A. Security interventions for workplace violence in the emergency department. Emerg Med Australas. 2018;30(6):802-7.
- 11. Duncan J, Brown NJ, Lock C, Trudgett S, Rothwell S, Rosengren D, et al. Increasing the Rate of Documentation of Security Interventions in the Emergency Department: Big Orange Security Sticker (BOSS) Project. J Nurs Care Qual. 2020;35(3):276-81.

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