Improving Trauma Care in India: the Potential Role of the Rural Trauma Team Development Course (RTTDC)

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Abstract The Rural Trauma Team Development Course (RTTDC) was devised to optimize trauma resuscitation training in under-resourced rural institutions. This program appears ideal for India because of its dense traffic, large population, and high frequency of rural trauma. We report on the feasibility and desirability of introducing RTTDC in India. An instructor course for 20 faculties and a provider course for 23 were conducted in New Delhi, India. The courses were evaluated by multiple choice question (MCQ) performance, by rating the modules on a three-point scale (1 = very relevant, 2 = relevant, and 3 = not relevant) for communication skills, principles of performance improvement and patient safety (PIPS), and clinical scenarios. Evaluation questionnaires including desirability of promulgation in India were completed using a five-point Likert Scale (1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree). Overall written comments were also provided. Both faculty and providers improved post-course MCQ scores ($p < 0.05$) with lower scores in the provider group. Seventy-eight percent faculty and 74 % providers rated the communication module

very relevant. PIPS was rated very relevant by 72 % faculty and 65 % providers. There were over 150 comments, generally positive with over 90 % of both faculty and providers rating strongly agree to agree that the course be promulgated widely in India. The RTTDC including plans for promulgation was enthusiastically received in India, and its potential for improving trauma care including communication skills and PIPS appears excellent.

Keywords RTTDC · Trauma training · Trauma education · Rural trauma in India

Introduction

Worldwide, the annual number of deaths from injury is well over five million and accounts for 12 % of the world's burden of disease [1–3]. Education focusing on preventive strategies, resuscitation, and definitive management of the injured should decrease this burden internationally including in India that has one of the largest populations in the world.

Programs such as the Advanced Trauma Life Support (ATLS®), Advanced Trauma Care for Nurses (ATCN®), Pre-Hospital Trauma Life Support (PHTLS), and the trauma evaluation and management [4] are conducted or planned to be conducted in India [5]. These programs are held in well-established, resource-rich centers. Ideally, patients sustaining serious trauma, including those that occur in rural settings, as is frequently the case in India, should be promptly transferred to these established trauma centers. However, this is frequently not possible because of distance, population density, and traffic conditions. Transport of patients from the injury scene to the nearest hospital (often with limited resources) is, therefore, frequent. Appropriate training of personnel in these under-resourced rural institutions

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Table 1 MCQ performance

	Mean number ($\pm$ SD) of incorrect answers		
	Pre-course	Post-course	<i>p</i> value between groups
Instructor	3.8 $\pm$ 2.0	1.5 $\pm$ 0.09	<i>p</i> <0.001
Provider	13.6 $\pm$ 1.4	6.8 $\pm$ 0.09	

could provide simple resuscitative care, stabilization, packaging, and safe transfer to the trauma centers, and hopefully improve survival.

Establishment of the ATLS® program has improved trauma outcome in institutions with ATLS®-trained physicians in a developing country [6], but the overall trauma mortality in that country was not significantly affected by ATLS® alone [7]. This lack of positive impact in overall trauma outcome from improved physician training in trauma institutions is, in part, due to inadequate resuscitation of patients before arrival at the trauma center. This deficiency was addressed by the establishment of a PHTLS program that improved overall outcome [8] by improving trauma resuscitation through such simple measures [9] as establishment of a secure airway, administration of oxygen, splinting of fractures, controlling hemorrhage, cervical spine protection, safe transport, establishment of intravenous access, gastric intubation, and the like. Personnel with minimal training such as those in many rural hospitals could easily be trained to institute these simple lifesaving measures.

The Rural Trauma Development Course (RTTDC) established through the American College of Surgeons Committee on Trauma focuses on providing the training necessary to acquire and practice these simple lifesaving resuscitative skills

on a priority basis according to ATLS® guidelines, particularly in under-resourced institutions [10]. Although most injuries occur in urban settings, the percentage of trauma deaths is higher in rural than that in urban areas [10, 11]. Many rural institutions [12] in India are minimally staffed with less than optimum resources, and many injuries occur close to these institutions. RTTDC is based on the concept that to save a trauma patient's life, sophisticated technology and advanced training are not essential. Simple resuscitative measures applied on a priority basis by nurses and paramedical personnel can improve trauma outcome by having patients reach the trauma institutions in a more survivable state.

This project that received ethics approval from the All India Institute of Medical Science, in New Delhi, reports on the feasibility and desirability of introducing the RTTDC and its potential for improving trauma care in India. It represents a preliminary assessment of the RTTDC in India based on course performance and subjective impressions of the participants involved in the inaugural RTTDC instructor and provider programs conducted in India. It serves as a foundation for a more rigorous evaluation of the actual impact of RTTDC in India.

Materials and Methods

In April 2011, an RTTDC instructor course for 20 faculties followed by a provider course for 23 participants in a rural community hospital was conducted. This consisted of didactic lectures, scenario-based discussion of trauma management utilizing local treatment resources, videos on

Table 2 Course evaluation—instructor course

Topics	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Program topics and content met the stated objectives	8	12			
Content was relevant to my educational needs	5	14	1		
Educational format was conducive to learning	7	12	1		
Acquired knowledge will be applied in my practice environment	10	10			
I will seek additional information on this subject	7	11	1	1	
Program was fair, objective, and unbiased towards any product or program	10	10			
Course manual is well written, visually appealing, and a good reference	10	9	1		
The audiovisuals enhance the presentation	11	9			
Course format (lecture/team performance scenarios) stimulates critical thinking	7	9	4		
Content is organized in a concise, logical sequence	5	13	2		
Instructors are knowledgeable about content	16	4			
Instructors' presentation style keeps participant's attention	12	8			
Instructors use examples to illustrate major points	16	4			
Instructors present content accurately and confidently	15	2	3		
Instructors answer questions in a supportive manner	17	3			
This course should be promulgated in India	20				

Table 3 Course evaluation—provider course

Topics	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Program topics and content met the stated objectives	17	6			
Content was relevant to my educational needs	17	6			
Educational format was conducive to learning	16	6			
Acquired knowledge will be applied in my practice environment	17	6			
I will seek additional information on this subject	16	7			
Program was fair, objective, and unbiased towards any product or program	17	6			
Course manual is well written, visually appealing, and a good reference	14	9			
The audiovisuals enhance the presentation	13	10			
Course format (lecture/team performance scenarios) stimulates critical thinking	13	10			
Content is organized in a concise, logical sequence	17	6			
Instructors are knowledgeable about content	18	5			
Instructors' presentation style keeps participant's attention	17	6			
Instructors use examples to illustrate major points	18	5			
Instructors present content accurately and confidently	17	6			
Instructors answer questions in a supportive manner	17	6			
This course should be promulgated in India	18	5			

trauma care principles, communication between referring and referral personnel, and principles of performance improvement and patient safety (PIPS). The focus is on airway control, oxygenation, ventilation, hemorrhage control, spine protection, packaging, communication, and safe transfer.

Evaluation

The course was evaluated by the following:

1. Pre- and post-course performance on a 20-item multiple choice question (MCQ). Mean pre- and post-course ($\pm$ SD) numbers of incorrect answers were compared within (paired *t* test) and between groups (unpaired *t* test), with a *p* value of 0.05 for statistical significance.
2. Questionnaire on course components using a five-point Likert scale ranging from strongly agree to strongly disagree.
3. PIPS, [d] communication, and [e] clinical scenarios on a three-point scale: 1 = very relevant, 2 = relevant, and 3 = not relevant to their local situation.

Comments—general comments—were provided by participants.

Results

1. MCQ performance (Table 1): Both faculty and providers improved their MCQ scores with lower scores in the provider group ($p<0.0001$). Mean numbers of incorrect answers out of 20 were 13.6 ± 1.4 pre-course and 6.8 ± 0.09 post-course for providers with 3.8 ± 2.0 pre-course and 1.5 ± 0.09 post-course for the instructors.
2. Table 2 (instructor) and Table 3 (provider) summarize the evaluation questionnaire responses. The majority of the responses ($>90\%$) for both faculty and providers were in the strongly agree to agree categories. All the instructors strongly agreed that the course should be promulgated in India, and most of the providers (18/23) also strongly agreed with 5/23 indicating that they agreed that the course should be promulgated in India.
3. PIPS evaluation (Table 4): Seventy-two percent faculty and 65 % providers graded PIPS as very relevant; 28 %

Table 4 Evaluation of modules

	PIPS		Communication		Scenario	
	Instructor	Provider	Instructor	Provider	Instructor	Provider
Relevant (%)	72	65	78	74	50	100
Very relevant (%)	28	35	22	26	50	0

instructors and 35 % providers graded this as relevant. Both groups recognized the importance of maintenance of quality care through frank discussion of good and adverse outcomes.

4. Communication (Table 4): Seventy-eight percent instructors and 74 % providers with 22 % and 26 %, respectively, considered this very relevant and relevant. The communication segment uncovered traditional hierarchical barriers to frank, collegial communication with a tendency to assign blame. The participants expressed intent to improve communication because of its potential benefit of patient care.
5. Scenarios (Table 4): One hundred percent providers and 50 % instructors rated these very relevant, and 50 % instructors considered them relevant. Comments included increasing the variety of scenarios for more relevance.

Additional Comments by Participants

There were over 150 comments, which are generally very positive. There was general support for widespread promulgation. Because of language diversity, suggestions for translation into Indian dialects and for decreasing the perceived relatively high cost of the manuals were made.

The communication module attracted many comments reflecting a perception of isolation between rural and referral institutions. This appeared to be replaced during the course by a team effort in open communication toward improving patient care.

Discussion and Conclusions

This RTTDC experience suggests that there is a definite role for the course in India. There is a great expectation that the course will provide much needed training of care givers in rural institutions and that this should improve trauma care in India. Trauma in rural areas continues to become associated with high mortality not only because of less than ideal training but also because of the dense traffic preventing timely transfer of patients even over short distances to trauma centers for definitive care [10–12]. The feeling of isolation among many rural care givers appears to compound the difficulty of providing optimum care for trauma patients because it impedes the communication process between referring and referral personnel—a communication process that should provide the opportunity for dialogue which would promote better care [11].

The establishment of the RTTDC should result in trauma patients arriving from rural communities at the trauma centers in more survivable condition because of the institution of more effective and timely resuscitative measures in the rural setting [13], with an expected decrease in preventable trauma deaths among these victims.

In pursuing wide dissemination of education material internationally in order to decrease the recognized worldwide burden of trauma, consideration must be given to local economic factors as well as diversity in language. Sensitivity to such needs has prompted an initial 40 % decrease in the manual price and consideration of translation and possible local printing of the educational materials that would facilitate wider dissemination.

The question remains as to whether this RTTDC in India would result in the anticipated benefits. Plans are therefore underway to study the effect of RTTDC in India by comparing trauma patient care and outcome between rural institutions with and without RTTDC training. Checklists on the timely application of resuscitative measures will be compared between the two groups.

Communication issues could be pursued by assessing whether timely communication was established, with satisfaction with this process and its impact on duration of care in the rural centers through questionnaires as was done in the USA [11]. The effect of the PIPS module will be studied by questionnaire requesting information on the frequency of review of patient management, patient outcome, and modification of care based on these sessions.

In the long term, comparison of patient outcome matched to injury severity in both groups would allow assessment of the impact of the RTTDC on trauma morbidity and mortality.

Data gathered from such a project should provide insight into the level of trauma resuscitation practiced in RTTDC and non-RTTDC institutions and serve as a guide for possibly instituting RTTDC training throughout rural communities in India, increasing public awareness of the trauma burden and improving attitude toward trauma education, trauma care, and prevention.

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