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Prehospital care training in a rapidly developing economy: a multi-institutional study



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ABSTRACT

Background: The trauma pandemic is one of the leading causes of death worldwide but especially in rapidly developing economies. Perhaps, a common cause of trauma-related mortality in these settings comes from the rapid expansion of motor vehicle ownership without the corresponding expansion of national prehospital training in developed countries. The resulting road traffic injuries often never make it to the hospital in time for effective treatment, resulting in preventable disability and death. The current article examines the development of a medical first responder training program that has the potential to reduce this unnecessary morbidity and mortality.

Methods: An intensive training workshop has been differentiated into two progressive tiers: acute trauma training (ATT) and broad trauma training (BTT) protocols. These four-hour and two-day protocols, respectively, allow for the mass education of laypersons—such as police officials, fire brigade, and taxi and/or ambulance drivers—who are most likely to interact first with prehospital victims. Over 750 ATT participants and 168 BTT participants were trained across three Indian educational institutions at Jodhpur and Jaipur. Trainees were given didactic and hands-on education in a series of critical trauma topics, in addition to pretraining and post-training self-assessments to rate clinical confidence across curricular topics. Two-sample t-test statistical analyses were performed to compare pretraining and post-training confidence levels.

Results: Program development resulted in recruitment of a variety of career backgrounds for enrollment in both our ATT and BTT workshops. The workshops were run by local physicians from a wide spectrum of medical specialties and previously ATT-trained police

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officials. Statistically significant improvements in clinical confidence across all curricular topics for ATT and BTT protocols were identified ($P < 0.0001$). In addition, improvement in confidence after BTT training was similar in Jodhpur compared with Jaipur.

Conclusions: These results suggest a promising level of reliability and reproducibility across different geographic areas in rapidly developing settings. Program expansion can offer an exponential growth in the training rate of medical first responders, which can help curb the trauma-related mortality in rapidly developing economies. Future directions will include clinical competency assessments and further progressive differentiation into higher tiers of trauma expertise.

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Introduction

Trauma is a leading cause of preventable death worldwide, accounting for more than 5 million fatalities each year. It is estimated that 90% of these deaths occur in economically rapid developing countries, such as India.¹ These particular countries have the highest burden of trauma death, suggested to be the result of increased motor vehicle utilization in last few decades, without the necessary changes in regulation and prehospital care.² Trauma care services throughout India are limited to major cities and suburban areas, with nearly nonexistent access to care in rural and semiurban areas. One study found that 80% of Indian trauma patients received no medical attention within the first hour, essentially nullifying the concept of the “golden hour.”³ In addition, only 4% of ambulance personnel are formally trained or certified and approximately one-third of ambulances serve exclusively as transportation media.⁴ Thus, medical first responder training has high potential to transform prehospital trauma care in rapidly developing countries.

Only recently has emergency medicine training become standardized in India, and much progress is needed. A cross-sectional study in South India showed that 35% of first responders had withheld treatment during more than one emergency, often because they did not know what to do.⁵ The same study revealed that nearly 42% of first responders lacked sufficient confidence in their prehospital care skills delivery. It has been demonstrated that training programs for layperson first responders systemically lead to decreased trauma-related mortality.⁶ Multiple studies have illustrated the development of layperson first responder training programs, and this type of training has been shown to enhance the capability of first responders in rapidly developing nations, especially those with a high injury burden.⁷⁻¹² However, these programs vary in duration and trainee experience, and whether they take into consideration the population's language barriers, baseline level of education, and desired level of proficiency after completion. The authors of the present article have established a program that addresses all of these issues, in addition to using technology-driven enhancements like video debriefing and high-fidelity simulation.¹³ This program offers the option for progressive, advanced training with a universally transferable design for other locations and circumstances.

This current initiative expands on the success of our previously established program,¹³ presenting a novel, evidence-based approach to layperson trauma training within the first two tiers of our progressive curriculum. This curriculum is

designed with funding support from Vyas Global Pre-hospital Care Education Initiative. The first tier, acute trauma training (ATT), focuses on the most basic knowledge required to gain baseline competency in the management of acute trauma, whereas using verbal debriefing and low-fidelity simulation on a standard mannequin. The second tier, broad trauma training (BTT), is a more advanced level of training comprised of all ATT content, supplemented with additional content, video-assisted debriefing of performance, and high-fidelity simulation training on more technologically advanced mannequins. Owing to the often lower educational and health literacy status in rapidly developing nations, courses are taught by speakers of the country's native language and with the aid of demonstration videos, also narrated in the native language. This approach presents a unique level of engagement in first responder training, not otherwise offered in India and other rapidly developing countries. Our ultimate goal is to establish a cost-effective, reproducible, and easy-to-understand program, which crosses language barriers and improves first responders' confidence in applying their prehospital trauma care skills due to universal program applicability.

Materials and methods

Our overall program development has spanned the past 6 years.¹³ Recently, the educational objectives from our previous training program were expanded to include a second tier of training and a new city in India. Our previous 10-subject curriculum was adapted for use by the less advanced ATT tier, in addition to the more advanced BTT tier of training, largely based on US trauma protocols. The free courses maintain a two-day length of training, with heavy emphasis on practical skills. Instruction used image-heavy presentations, a comprehensive printed manual, and debriefing for long-term retention. Practical skills training incorporated a standard mannequin for the ATT group and the advanced *SimMan 3G* for the BTT participants.

Setting

The training program was conducted in the Indian cities of Jodhpur and Jaipur, spending 4 days in each city during the month of November in 2014. In Jodhpur, we tested our BTT protocol, whereas in Jaipur, we tested both the ATT and BTT training protocols. The study was part of a multi-institution collaboration, with support from over 50 faculty members

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