

Feasibility of Golden-Hour Interventions on Improving Victim Survival Due To Road Traffic Injuries In India

Research Article

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Abstract

Road Traffic Injuries (RTI) is one of the most significant emerging public health challenges of the 21st century. With a global annual death toll of 1.25 million, RTI is one of the leading causes of premature death, and disproportionately affects low and middle-income countries (LMICs). India ranks top amongst LMICs in its national burden of RTI. Research into RTI prevention and trauma management is urgently needed. We undertook a scoping review of available evidence on the feasibility of “golden hour” interventions delivered to RTI victims to reduce mortality. We found limited evidence on this topic. However, most of the identified evidence highlight India’s bigger problem of gaps in pre-hospital trauma management system. Several solutions have been proposed to bridge this gap, including mobilizing community lay-persons for trauma management. The current availability of evidence is not sufficient for undertaking a systematic review. However, interventions identified in this review could form the basis for future program evaluation in their effectiveness in reducing mortality.

Introduction

RTI as a global health burden

RTI is defined as “a fatal or non-fatal injury incurred as a result of a collision on a public road involving at least one moving vehicle.”¹ Between 1990 and 2015, the global mortality due to RTI increased by over 50 per cent, and is becoming one of the most important significant emerging public health challenges of the 21st century.

Today, about 1.25 million people die traveling on the world’s roads each year.² Many more sustain serious injuries and long-term adverse health consequences. Among those 15 – 29 years of age, RTI is a leading cause of premature death worldwide.² In the general population, RTI is currently the ninth leading cause of death, and is expected to become the seventh leading cause of death by 2030.²

This predicted increase will largely take place in low and middle-income countries (LMICs). While LMICs collectively account for 53% of the world’s total motor vehicle ownership, they suffer from 85 – 90% of the world’s RTI-related mortality.³

This is partly due to the “motorization revolution” happening in many LMICs, wherein rapid modernization and urbanization coincided with unprecedented proliferation of motorized vehicles within a short few years. Very often, the necessary infrastructure, policies, regulatory enforcement, and emergency medical response have not kept up with the rate of increase in vehicle use.²

Traffic patterns in LMICs

Compared to HICs, LMICs have higher proportions of vulnerable road users (VRUs). VRUs refer to road users lacking physical protective ‘shells’ while using public roads; these include, among others, pedestrians, bicyclists, motorcyclists, and rickshaws.⁴ Moreover, traffic patterns in LMICs include greater variety and intensity of traffic mix between VRUs and four-wheeled cars, and most places lack sufficient separation between car traffic and other road users. Therefore, VRUs in LMICs are at a much higher risk for RTI and related deaths, and account for up to 75% of all road fatalities in LMICs.⁵

Case for India

India is the second most populous country in the world, and faces many of the road traffic challenges typical of LMICs.⁶ In 2014, India's official RTI death toll ranged between 141 526 and 207 551, and ranks top amongst LMICs.^{2,7} India alone accounts for 11 - 17% of all traffic mortalities around the world, and RTI deaths cost India approximately 3% of its annual GDP.^{2,7} Like other LMICs, VRUs are especially susceptible, and there is a need to assess the scope of evidence on practices to reduce mortality from RTI.

Golden Hour

The term 'golden hour' (GH) is a concept rooted in emergency medicine.⁸ GH refers to a window of opportunity before hospital arrival (pre-hospital time) during which medical intervention can significantly reduce a patient's morbidity and mortality.⁸ While evidence has been inconclusive on the exact duration of GH needed to maximize survival, the general understanding is that a reduction in pre-hospital can benefit victim survival in cases of acute injury.⁸

Methodology

We performed literature search on four databases: PubMed, PsycInfo, ProQuest, and ScienceDirect using methodology guided by the 2015 Joanna Briggs Institute Reviewers' Manual.⁹

We sought to include studies which provide an up-to-date snapshot of RTI in India or similar LMICs, as well as current trauma-management practices specific to the treatment of road injuries. Studies on RTI conducted in a setting outside of India or similar LMICs were not included.

Consistent with guidelines on the conduct of scoping reviews, we did not appraise methodological quality in our included articles.

Discussion

There is limited evidence on the feasibility of GH interventions specific to reducing RTI mortality. Most of our identified evidence highlight

India's bigger problem of inadequate pre-hospital treatment in trauma care.

Like many LMICs, India currently lacks a national standardized pre-hospital care system.¹⁰

¹¹ Very often, trauma victims are transported to hospitals through non-EMS channels. Since 2005, GVK-EMRI – a public-private partnership – has emerged as a provider of EMS across India to address this gap.¹¹ Even so, the majority of EMS services are only available in large urban centres.¹¹ In many cases, EMS serves only as a transportation medium, and rarely provide pre-hospital care while transporting victims to the hospital.¹⁰

Three studies discussed mobilizing community bystanders as a feasible way to improve pre-hospital interventions for trauma victims.¹²⁻¹⁴ Oestern, Garg, and Kotwal in 2013 proposed a two-tiered system to provide pre-hospital care within a "golden hour": first tier consists of local residents trained in recognizing medical emergencies and providing basic first-aid treatment until formally trained health personnel arrive. Health personnel would then provide more advanced second-tier treatment - scene management, rescue, and transport of injured people.¹³

Basic levels of pre-hospital care can make a life-or-death difference. Empowering community bystanders represent a step closer to bridging India's current gap in pre-hospital care. If basic pre-hospital care is available, such as stopping airway obstruction or external hemorrhage, a significant number of RTI deaths can be averted in India.

Conclusion

From this scoping review, we found that there is relatively scarce evidence on GH interventions to reduce RTI mortality in India. At this point, the breadth of evidence is not sufficient to conduct a systematic review. The limited evidence revealed an underlying problem – the current fragmented trauma care system in India. Recent research have proposed solutions in bridging the gap of pre-hospital care, with researchers suggesting combinations of strategies. As these systems

become better established, further research on their effectiveness is encouraged, as this will enable researchers to inform policymakers in optimizing post-trauma management of RTI in India. The success of these systems and policies can then be disseminated to other highly populated LMICs to address RTI as one of the most significant emerging public health challenges in the 21st century.

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