Prehospital trauma systems reduce mortality in developing countries: A systematic review and meta-analysis

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Abstract:

BACKGROUND: The majority of trauma deaths in the developing world occur outside of the hospital. In the mid-1990s, preliminary studies of prehospital trauma systems showed improvements in mortality. However, no empirical data are available to assess the overall benefit of these systems. We undertook a systematic review and meta-analysis to assess the effectiveness of prehospital trauma systems in developing countries.

METHODS: We conducted multiple database and bibliography searches (from inception until December 2010) to identify articles assessing the effectiveness of prehospital trauma systems in developing countries. The primary outcome was mortality. Secondary outcomes were physiologic severity score, Injury Severity Score, and prehospital time. We calculated relative risks (95% confidence intervals [CIs]), performed a sensitivity analysis, and pooled estimates using a fixed effects method.

RESULTS: Fourteen studies met our inclusion criteria for qualitative analysis. Eight studies representing seven countries (n = 5,607) were included in the meta-analysis. Our pooled estimates show a 25% decreased risk of dying from trauma in areas that have prehospital trauma systems (relative risk [RR], 0.75; 95% CI, 0.66–0.85), with no significant heterogeneity ($\chi^2 = 3.71, p = 0.72$). Rural settings showed slightly enhanced treatment effect compared with urban settings (RR, rural 0.71; 95% CI, 0.59–0.86 vs. urban 0.79; 95% CI, 0.65–0.94). In-field response time was reduced in both rural (without an ambulance system, 66 minutes, 95% CI: 24–108) and urban (with an ambulance system, 6 minutes, 95% CI: 5.47 to 6.53, p < 0.0005) settings.

CONCLUSION: Prehospital trauma systems in developing countries, particularly middle-income countries, reduce mortality. These data should inform and encourage developing countries to adopt prehospital trauma systems at the policy level.

LEVEL OF EVIDENCE: Meta-analysis, level III+.