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Assignment Title: Critically Appraised Topic in Trauma

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Reference manager: EndNote

Title: Trauma Team Training is Effective in Reducing Mortality and Morbidity

Clinical Scenario:

Paramedics are called to a motor vehicle accident involving several patients with multiple trauma injuries. Is it possible that patients' morbidity and mortality would be more effectively reduced if the initial patient care was provided by a paramedic team with prior trauma team training compared to a paramedic team who did not take part in trauma team training?

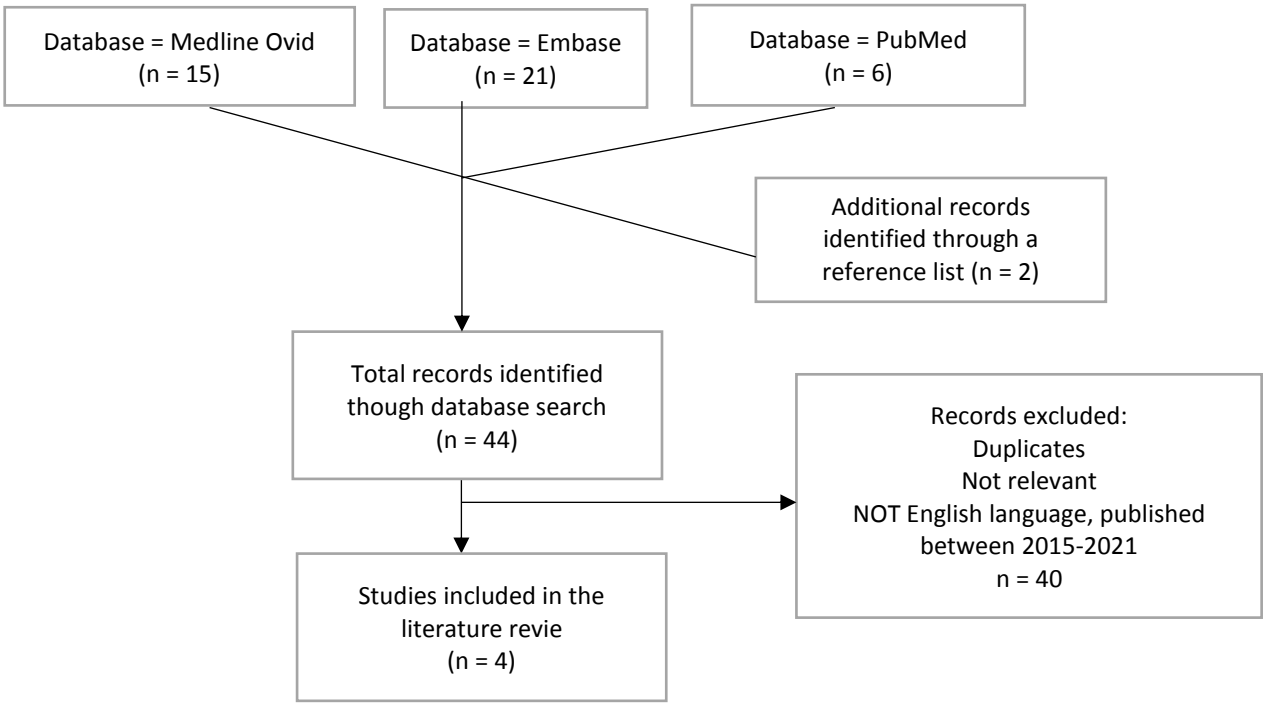
PICO (Population-Intervention-Comparison-Outcome) Question

In prehospital trauma patients, is trauma team training effective in reducing mortality and morbidity in trauma patients?

Search Strategy

(Trauma team training OR TTT) AND (paramedic* OR prehospital OR pre-hospital OR out of hospital OR "out-of-hospital" OR ambulance* OR "emergency medical services") AND (morbidity OR Mortality OR survival rate*). The search was limit to (English language AND year="1st January 2015 – 15th September 2021").

Search Outcomes



Relevant studies

Author, Year	Study Design and LOE	Sample Characteristics	Aims	Results	Strengths and Limitations
(Malekpour et al., 2017)	Retrospective cohort study LOE 3	276 patients from 3 non-trauma facilities (that participate in the RTTDC training) who were referred to a level I trauma centre. Referrals 2 years before the RTDC (*n* = 97) were compared with referrals 2 years after the course (*n* = 179).	To investigate whether the RTTDC training was associated with early evaluation and transfer of trauma patients.	Transfer acceptance time was significantly shorter after the RTTDS training. Transfer time was significantly reduced following the RTTDC training. Transfer time was significantly higher for both before and after RTTDC training for patients receiving pretransfer imaging. Mortality was nearly halved after the RTTDC training (reduced from 16.7% to 5.5%) but was not statistically significant.	(+) Data form the pre-hospital setting was included (+) Moderate impact journal - factor of 2.4 (-) Small sample size (-) Non-randomised study so any improvements cannot be directly attributed to the effects of the training program (-) Retrospective study (-) Single centre study which limits generalisation of results
(Murphy et al., 2018)	Retrospective comparative study LOE 3	2389 trauma patient records were included in the study – 1116 in the pre-intervention	To compare health service delivery and outcomes	There was a significant reduction in time to critical operation from 2.63h in the	(+) Larger sample size (+) Study was conducted in Australia

		group and 1273 in the post intervention group. The groups were compared during two concurrent four-year period – before and after implementation of a simulation based multidisciplinary trauma team training at Level 1 Adult Trauma Centre.	for patients with severe trauma in the years before and after implementation of a simulation based multidisciplinary trauma team training program.	pre-group to 0.55h in the post-group. The overall trauma patient LOS in ED increased. There was no reduction in mortality.	(+) Moderate impact journal - factor of 2.6 (+) No baseline differences between the groups prior to arrival to ED (-) Not specific to pre-hospital setting (-) Not a randomised controlled trial so any improvements cannot be directly attributed to the effects of the training program (-) Missing data entry making it difficult to determine whether unpopulated fields presented the absence of an event or missing data (-) Single centre study which limits generalisation of results (+) Use of multidisciplinary team
(Petroze et al., 2015)	Prospective comparative study LOE 3	798 patients in the pre-education period and 575 patients in the post-education period were included.	To investigate the effects of planned trauma and resuscitation education on patient outcomes	Overall mortality of injured patients decreased after the training implementation (but did not reach	(+) No significant baseline differences between patients in the pre-intervention and post-

		Trauma registry data collected over a 6-month period prior to the Trauma Team Training course was compared to data collected during a 6-month period after the training.	and resource utilisation.	statistical significance). Patients with an initial GCS of 3 to 8 had the highest injury-related mortality, which significantly decreased from 58.5% to 37.1%. No statistically significant changes were found for the rates of early intubation, cervical collar use, imaging studies, or transfusion. Patients with initial GCS of 3 to 5 in the post-training period had higher utilisation of head CT scans and chest X-rays.	intervention group (+) Moderate impact journal - factor of 3.3 (-) Not specific to the pre-hospital setting (-) Study conducted in Rwanda so possible limited generalisation of results to Australia (-) No randomisation of records (-) Single centre study which limits generalisation of results (-) Data limitations related to data registry, staff turnover and resource limitations for healthcare providers
(Dennis et al., 2016)	Pre to post therapeutic care management study LOE 3	253 patients were included in the study – 130 in the RTTDC group and 123 in the control group.	To investigate the effect of RTTDC training on trauma patients.	The RTTDC group recorded a significant reduction of 61 minutes in referring hospitals compared to the control group. The RTTDC group demonstrated a significant reduction of	(+) Moderate impact journal - factor of 3.4 (+) No differences on most baseline data (-) Not specific to the pre-hospital setting (-) Small sample size

				41 minutes in time to call for transfer compared to the control group. There were no differences in mortality between the RTTDC group and the control group.	(-) Baseline differences on the injury severity score between the groups (-) The retrospective nature of the study (-) Selection of RTTDC centres was not randomised (-) Not all providers took part in the RTTDCs training so there is a likelihood that some providers taking care of patients did not attend the RTDC

Abbreviations: LOE – Level of Evidence; RTTDC – the Rural Trauma Team Development Course.; LOS – the Length of Stay; ED – Emergency Department; GCS – Glasgow Coma Score.

Relevance and Rationale of the Question

Literature has emphasised the critical importance of the emergency response stage to trauma patients since this is the time-period when many preventable complications in trauma care patients can be reduced (Murphy et al., 2018). Effective early care of trauma patients is essential to reduce mortality and morbidity resulting from injuries (Petroze et al., 2015). Trauma team training leading to collaborative and efficient response to trauma injuries and patient management may then subsequently lead to greater outcomes, both in reducing morbidity and mortality, of trauma patients (Murphy et al., 2018).

Comments

There were limited studies available that investigated the impact of the trauma team training on patient morbidity and mortality in the pre-hospital setting. Data on the effects of team trauma training on patient morbidity and mortality was predominantly collected from hospitals. Only one study (Malekpour et al., 2017) included data from the pre-hospital setting. In this study the trauma team training was associated with significant reductions in transfer acceptance time and overall transfer time. While patient mortality was reduced by almost 50%, this reduction did not reach statistical significance. Further, most of the evidence for this topic came from retrospective studies. No studies utilising randomised controlled trials were available on this topic.

Consider

Based on the reviewed articles, limited conclusions can be made about the impact of trauma team training on patient mortality and morbidity in the pre-hospital setting. There is still a considerable lack of knowledge about whether and to what extent trauma team training affects trauma patient outcomes. Thus, it is important to conduct further research in the pre-hospital setting to determine whether trauma team training is effective in reducing mortality and morbidity in trauma patients.

Clinical bottom line

In the pre-hospital setting, trauma team training leads to reduced acceptance and transfer time for trauma patients. Trauma team training may play a role in reducing mortality and morbidity of trauma patients. However, not enough evidence is present to make any firm conclusion of the effect of trauma treatment training on trauma patients in the pre-hospital setting. Thus, due to the very limited evidence available in relation to the pre-hospital environment, further research is essential to answer this question.

References

Dennis, B. M., Vella, M. A., Gunter, O. L., Smith, M. D., Wilson, C. S., Patel, M. B., Nunez, T. C., & Guillamondegui, O. D. (2016). Rural Trauma Team Development Course decreases time to transfer for trauma patients. *The journal of trauma and acute care surgery*, *81*(4), 632-637. https://doi.org/10.1097/TA.0000000000001188

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Petroze, R. T., Byiringiro, J. C., Ntakiyiruta, G., Briggs, S. M., Deckelbaum, D. L., Razek, T., Riviello, R., Kyamanywa, P., Reid, J., Sawyer, R. G., & Calland, J. F. (2015). Can focused trauma education initiatives reduce mortality or improve resource utilization in a low-resource setting? *World Journal of Surgery*, *39*(4), 926-933. https://doi.org/https://dx.doi.org/10.1007/s00268-014-2899-y