

# Long-term trauma outcomes heavily impacted by gender and education level

January 4 2019

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Trauma is a leading cause of disability in the world, resulting in more disability-adjusted life years than any other disease. While in-hospital, trauma-related mortality has decreased to just 4 percent in the U.S., little is known about what happens to the 96 percent of patients who survive their trauma injuries but may suffer debilitating long-term effects. Through the Functional Outcomes and Recovery after Trauma Emergencies (FORTE) project, Brigham and Women's Hospital researchers followed 1,736 trauma patients over 30 months to determine the long-term functional, physical, and mental health consequences of trauma and the factors associated with them. The FORTE project's findings show that long-term sequelae of trauma exceed previous expectations and identified that patient sociodemographic factors such as female gender and low education were associated with worse recovery. This suggests that social support systems are an essential component of recovery. The findings appeared in *Annals of Surgery*.

"For more than two decades, trauma surgeons and patients have been hoping to change trauma care to be more responsive to long-term outcomes. This study shows that with just incremental effort we can fundamentally change how we assess trauma outcomes, enabling a paradigm shift that will benefit our patients and trauma systems," said Adil Haider MD, MPH, a trauma surgeon and Kessler Director of the Center for Surgery and Public Health at Brigham and Women's Hospital, and first author of the study.

The FORTE project began in response to the lack of comprehensive

evaluations of long-term trauma outcomes in the United States, since most trauma outcome studies rely on trauma registry data, which only captures in-hospital outcomes. Recognizing the gap in trauma surveillance and [quality improvement](#), the National Academies of Sciences, Engineering, and Medicine (NASEM) recommended the development of measures related to quality of trauma care and long-term outcomes in their June 2016 report, "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury." The FORTE project evaluated the feasibility of a standardized approach for collecting long-term patient-reported outcomes (PROs) after trauma in the U.S., starting with three Level 1 trauma centers: Brigham and Women's Hospital (December 2015), Massachusetts General Hospital (June 2016), and Boston Medical Center (June 2016). Since initiation of data collection, adult trauma survivors admitted to the participating institutions with moderate or severe injuries (Injury Severity Score (ISS)  $\geq$  9) were routinely contacted between 6-12 months after [injury](#). With a cooperation rate of 65 percent (1,736 out of 2,691), interviews were conducted via telephone by a trained member of the research team using a structured telephone survey in English or Spanish. Using institutional trauma registries, patient data was linked to patient-report outcome measures, including work status, quality of life (emotional well-being, recovery and resilience, physical well-being, and functional engagement), physical and mental health, and post-traumatic stress disorder (PTSD).

The multi-center study found that nearly half of the patients (48 percent) reported [physical limitations](#) and daily pain. Over one-third (37 percent) needed help for at least one activity of daily living due to the traumatic injury, and 20 percent screened positive for PTSD. Of those patients who were employed prior to injury, 40 percent had not returned to work at the time of follow-up. Quality-of-life measures such as general health, physical and social functioning, and bodily pain were also significantly below U.S. norms.

Diverging from previous research on short-term outcomes, specific patient sociodemographic factors such as gender and education, in addition to a number of comorbidities and length of hospital stay, had more impact in predicting long-term outcomes than injury severity. While some studies have shown that females have better short-term trauma outcomes, this study found the female gender was an important predictor of decreased long-term functionality and physical health. Although it is well known that education plays a significant role in all health outcomes, this is the first study to show that the relationship extends to long-term functional, physical, and mental health outcomes after trauma. Level of education, the most predictive variable of long-term outcomes, is not currently captured in trauma registries. Traditional injury severity markers were created to predict mortality and appear to be less effective in predicting long-term trauma outcomes, failing to capture key elements that influence recovery.

"The FORTE study offers a new and revealing window into the outcomes of trauma patients. Often focused in short-term gains, physicians ignore the long-lasting impact that sudden injury and its treatment has on our patients' lives. Through FORTE, we will be able to understand more and treat better," said George Velmahos, MD, Ph.D., Division Chief of Trauma, Emergency Surgery and Surgical Critical Care at Massachusetts General Hospital and author on the study.

The unexpected severity of the long-term consequences of traumatic injury makes it critical to better understand the link between long-term outcomes, its predictors, and the types of specific trauma services and processes that could be used for interventions. The researchers encourage the collection of long-term trauma outcomes with the goal of standardizing them as the American College of Surgeons did with in-hospital outcomes through the creation of the National Trauma Data Standard.

**More information:** Adil H. Haider et al, Factors Associated With Long-Term Outcomes After Injury, *Annals of Surgery* (2018). [DOI: 10.1097/SLA.0000000000003101](https://doi.org/10.1097/SLA.0000000000003101)

Provided by Brigham and Women's Hospital

Citation: Long-term trauma outcomes heavily impacted by gender and education level (2019, January 4) retrieved 19 April 2024 from <https://medicalxpress.com/news/2019-01-long-term-trauma-outcomes-heavily-impacted.html>

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