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Study quantifies injuries and combat casualty care trends during War on Terror

March 27 2019

Thousands of military service members lost their lives or were severely injured while serving our country during America's longest war, known as the Global War on Terrorism. A researcher at The University of Texas at San Antonio (UTSA) is now documenting the war's casualty statistics, mortality trends and treatment advances.

UTSA researcher, Jeffrey Howard, published an article today in *JAMA Surgery* that takes a closer look at the casualties of war and the trauma care they received during the military conflicts in Afghanistan and Iraq that began after September 11, 2001.

Howard, the paper's lead author and an assistant professor in the Department of Kinesiology, Health and Nutrition in the UTSA College of Education and Human Development (COEHD), and his collaborators analyzed data compiled from Department of Defense (DoD) databases about the 56,763 injuries recorded in Afghanistan and Iraq from October 1, 2001 through December 31, 2017.

The researchers assessed casualty status (alive, killed in action (KIA) or died of wounds (DOW), the case-fatality rate (CFR) and the contribution of different interventions (use of tourniquets, blood transfusions, and transport to surgical facility within 60 minutes) to changes in the CFR.

"The Afghanistan and Iraq conflicts have the lowest case-fatality rates in U.S. history, but thepurpose of this study was to provide the most

comprehensive assessment of the trauma system by compiling the most complete data on the conflicts and analyzing multiple interventions and policy changes simultaneously," explained Howard. "We used novel analytical methods to simulate what mortality would have been without key interventions."

Key findings suggest that injury patterns and the severity of sustained injuries increased during the war. For example:

- Injuries caused by explosives increased 26 percent in Afghanistan and 14 percent in Iraq
- Head injuries increased 96 percent in Afghanistan and 150 percent in Iraq
- Survival for critically injured casualties increased from 2.2 percent to 39.9 percent in Afghanistan and from 8.9 percent to 32.9 percent in Iraq
- The case-fatality rate was cut in half from 2001 to 2017 (Afghanistan from 20 percent to 8.6 percent and Iraq from 20.4 percent to 10.1 percent) even as injury patterns and severity increased

Three key interventions (increased use of tourniquets, increased use of blood transfusion, and more rapid hospital transport times, especially in Afghanistan) were responsible for about a 44 percent of the reduction in mortality. The researchers estimate that 1,622 lives were saved from these interventions.

They also found that without these changes in intervention and policy, an estimated 3,600 additional deaths would have occurred between 2001 and 2017.

Howard says the paper is an extension of his previous work as a DoD epidemiologist and researcher evaluating trauma care practices, like the

use of blood transfusions and the transport of casualties to medical treatment facilities.

"My prior work involved evaluating the DoD policy changes mandated by former Secretary of Defense Robert Gates regarding the reduction of transportation times and other trauma care guidelines," said Howard. "In the past, we had to assess these questions with less complete data than what was compiled for this current study."

The UTSA researcher noted that more critically injured military service members reached surgical care, with increased survival rates, which suggests that there were improvements in hospital care as well.

Howard said one of the main goals of this current work is to ensure that the lessons of war are not lost.

"Many of the lessons from the current war had actually been learned before in prior wars," he said. "My colleagues and I are trying to propagate these lessons throughout the scientific and medical literature to inform military trauma care policies for the future."

More information: *JAMA Surgery* (2019). DOI: 10.1001/jamasurg.2019.0151 , jamanetwork.com/journals/jamas … cle-abstract/2729451

Provided by University of Texas at San Antonio

Citation: Study quantifies injuries and combat casualty care trends during War on Terror (2019, March 27) retrieved 17 April 2024 from https://medicalxpress.com/news/2019-03-quantifies-injuries-combat-casualty-trends.html

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