Medical News & Perspectives

For Survivors of Intimate Partner Violence, Overlooked Brain Injuries Take a Toll

Rebecca Voelker, MSJ

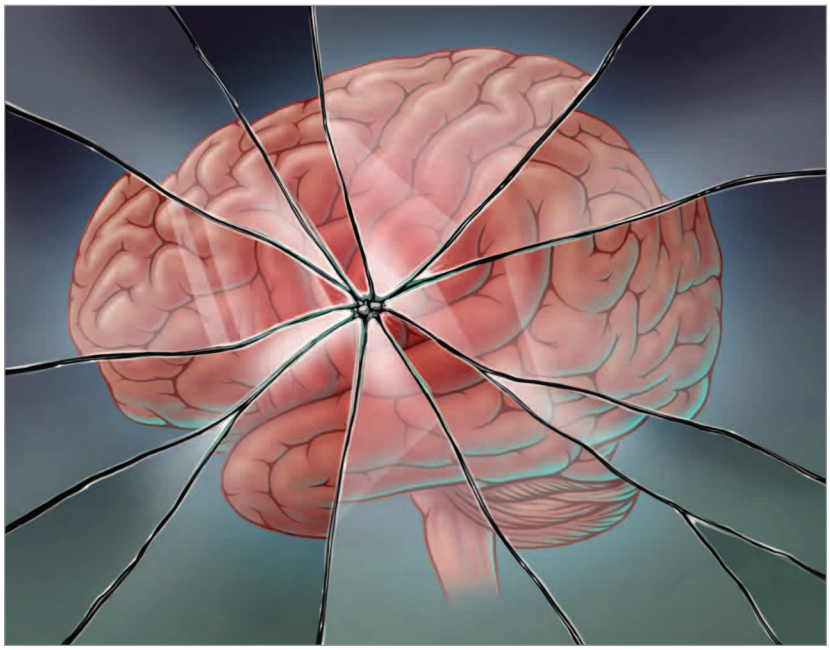
If not for a group of domestic violence survivors, Glynnis Zieman, MD, might have pursued a career in neurooncology. "[After] a year of training in that, I switched paths," says Zieman, a neurologist at the Barrow Neurological Institute's Concussion and Brain Injury Center in Phoenix. Instead of devising treatment regimens for patients with brain tumors, she helps a largely overlooked population—people with brain injuries sustained at the hands of an intimate partner.

"Professionally, these are my favorite patients," she says. Women, men, and children come to Barrow from all walks of life, with all kinds of head trauma. But Zieman says the care offered to homeless survivors of intimate partner violence is especially meaningful.

"Most of these women, and men, have never had someone sit down and listen to them," she says. "And they've certainly never had a doctor give 30 to 45 minutes and sit there and explain to them what a brain injury is, and why they have the symptoms they have."

Medical specialty groups have offered clinician education about detecting signs of partner violence for decades. The US Preventive Services Task Force is in the process of updating its 2013 recommendation advising clinicians to screen women of childbearing age and refer those who screen positive to ongoing support services.

But some experts say what's lacking is attention to the long-term consequences of being hit, punched, or kicked in the head over and over. Concussion and chronic traumatic encephalitis (CTE) among professional football players who take continual



hits to the head have grabbed headlines, but for survivors of partner violence—some who've been hit every day for years—brain injuries have essentially gone unnoticed.

The National Football League reported that players sustained 244 concussions in 2016. In comparison, Centers for Disease Control and Prevention data gathered from 2010 to 2012 showed that nearly 15.3 million people in the United States said a partner had abused them during the previous year. An estimated 30% to 74% of survivors have sustained a brain injury, but experts say the high proportion who endure multiple head injuries face the most severe consequences.

"It's these repetitive concussive and subconcussive brain injuries that they're sustaining that ultimately seem to result in extremely bad outcomes 8, 10, 15 years later," says Eve Valera, PhD, an assistant professor of psychology at Harvard Medical School in Boston who has used functional magnetic resonance imaging (MRI) and other technologies to examine brain abnormalities in women with traumatic brain injury (TBI) stemming from partner abuse.

"I would be surprised if these women weren't sustaining some type of CTE or CTE-like phenomenon later on," Valera adds.

And unlike athletes who are sidelined after a concussion-causing hit, survivors of partner violence often have little or no opportunity to recover in between injuries. "Their abusers don't care if they're still symptomatic from their prior injuries," Zieman says.

Unique Partnerships

At the Barrow Institute, Zieman oversees the first and, as far as she knows, only program in the United States that partners with homeless and domestic violence shelters to screen survivors for TBI and offer medical care for those injuries. The program was the brainchild of Ashley Bridwell, MS, a Barrow social worker, and Javier Cárdenas, MD, director of the Barrow Concussion and Brain Injury Center.

"They trained the staff of the shelters to screen every resident that comes in for traumatic brain injury," Zieman explains. Shelter staff use the HELPS screening tool, a simple 5-question survey that requires no special credentials to administer. Residents who screen positive are referred to Barrow. "They're able to come to our clinic and receive all their care free of charge regardless of what their insurance may or may not cover."

Since the program began in 2012, about 350 patients with TBI who were referred from shelters have received neurological care at Barrow. In addition to MRI scans, patients may receive cognitive testing and medication. A community grant that supports the program also covers TBI-related support such as psychiatric consultations; social work services; x-rays; and physical, occupational, and speech therapy.

Case workers from the shelters help survivors find housing and jobs. A few go back to their abusers, but Zieman says most do not. Although she hasn't evaluated clinical outcomes of patients treated in the program, studies suggest rehabilitation services can improve patients' functional recovery and quality of life after TBI.

"Those are exactly the types of services we need," clinical psychologist Katherine Iverson, PhD, says of Zieman's and Barrow's efforts. As a clinician-researcher with the Women's Health Sciences Division of the National Center for PTSD at the VA Boston Healthcare System, Iverson has studied women veterans with TBI resulting from partner violence.

Some VA clinics now screen women veterans for intimate partner violence, Iverson notes. Those who say they've been abused are referred to social workers, psychologists, or other resources within the VA. "The recommendation is to screen women at least annually in primary care settings in particular, as well as others within the VA, for past-year [intimate partner violence]," she explains.

Few recent estimates of screening rates in primary care settings are available. However, a 2005 study involving 2465 women showed that in primary care settings, 38% of women who were recently abused and 21% who were not said a health professional had asked them about partner violence. Furthermore, a 2011 study of nearly 1000 survivors who went to an emergency department after a police-documented violent incident showed that 72% weren't identified as having been abused. "If we don't know this is happening, we can't do much about it," Zieman says.

That's why Barrow, which is based at St Joseph's Hospital and Medical Center, aims to develop itself as a center of excellence in care for TBI stemming from partner violence. Zieman hopes to include primary care clinicians in physician education through residency programs at St Joseph's, which is a clinical affiliate of the University of Arizona College of Medicine–Phoenix. The material would cover screening for partner violence and information about TBI's posttraumatic sequelae.

"I think that's a good next step," she notes, because many new patients with partner violence–related TBI seek primary care or obstetric services.

Added Burden

Sustaining a brain injury as a result of partner-related violence can make an already grave situation worse. Iverson's research involving 176 women veterans in New England showed that those with TBI resulting from partner violence were more prone to depression, PTSD, and poorer physical or mental health than the women who incurred neither TBI nor an injury to their head, neck, or face during partner violence. Survivors with TBI also used more VA outpatient medical and mental health services than those who didn't sustain a brain injury.

In addition, Iverson's work has shown that women veterans with TBI resulting from partner violence are more likely than those without a brain injury to have lost consciousness, felt dazed or confused, sustained eye or ear injuries, been strangled, or had no memory of what happened immediately afterward. At the Barrow program, the patients referred by shelters often can't give details of all their injuries. "They've sustained too many to count," Zieman says.

She, Bridwell, and Cárdenas gathered data on 115 patients from the shelters to help health professionals gain a better understanding of partner violence repercussions. The study showed that 88% of the patients had more than 1 brain injury; 81% had lost count. In addition, 81% had lost consciousness at least once from a brain injury. Headache, memory loss, trouble sleeping, and other cognitive problems were the most common symptoms. Only 21% sought medical care at the time they were injured.

Even among those who do seek care, the possibility of TBI often takes a back seat to more immediate medical needs. "They need to fix their broken ankles or broken arm … or the retina that was just detached," says Valera of Harvard. "So the brain injury is the last thing that's ever considered."

Valera published her first study on brain injury due to partner violence in 2003. Among 99 women recruited from shelters and other types of support services, 74% had sustained 1 and 51% had more than 1 brain injury inflicted by an intimate partner. The study also showed a dose-response effect.

"The more [injuries] you had, the higher scores you had on measures of depression, anxiety, and PTSD symptomatology, and then the more poorly [you] performed on a test of memory, learning, and a test of cognitive flexibility," she explains. That relationship, Valera adds, suggests that the psychological trauma of abuse may not be the only explanation for cognitive problems; brain injury might also play a role.

A Brain Disrupted

Next, Valera turned to imaging studies to detect brain abnormalities in women who sustained blows to the head. The sum of her research, Valera says, should help explain why cognitive deficits seen in survivors likely don't result solely from the psychological trauma.

Using advanced MRI techniques to measure diffuse axonal injury—the shearing of axons that connect different regions of the brain—she examined connections between 2 networks in the brain: the salience network, which picks out what's salient from the daily flood of information, and the default-mode network, which is most active during resting wakefulness and integrates memories of personal experiences. Diffuse axonal injury that disrupts how these 2 networks interact is likely to impair cognition.

Valera analyzed data from 20 women who completed questionnaires about their symptoms and underwent cognitive testing and neuroimaging scans. The results

showed that the more brain injuries a woman had and the more recent the injuries were, the weaker the connection was between the 2 networks.

"[T]he less the 2 brain regions communicated with one another, the worse a woman tended to be able to learn a list of words and remember that list 20 minutes later," Valera explains.

It's important to note, she adds, that the study controlled for a number of variables that could affect connections between the brain networks: age, the severity of partner abuse, childhood trauma, mental disorders, and medication use or substance dependence. All of these factors could contribute to cognitive problems like trouble concentrating or difficulty finding the right words.

"[T]hese data are showing that no, this is not just abuse; this is specific to brain injuries and this needs to get the same attention that, for example, the football players, the military personnel, are getting." She hopes the results might help clinicians improve how they evaluate and treat survivors with brain injuries.

Paul van Donkelaar, PhD, professor of health and exercise sciences at the University of British Columbia Okanagan campus in Kelowna, also documents neurophysiological changes in survivors. Over the past year, he and his partner Karen Mason have recruited survivors from community organizations such as the Kelowna Women's shelter, where Mason is executive director, to assess their mental health, TBI symptoms, and cerebrovascular and neurocognitive functioning.

Using transcranial Doppler ultrasound to measure cerebrovascular functions, van Donkelaar has observed deficits in cerebral autoregulation—the physiological process that maintains appropriate blood flow to the brain during changes in blood pressure—in survivors of partner violence.

"In concussion, or in brain injury, the ability of the brain to blunt those changes in blood pressure has been compromised," he explains. "We're definitely seeing that in survivors [of] intimate partner violence."

The study also includes testing for blood biomarkers of neural damage and inflammation. "We're looking for tau," van Donkelaar says. Its presence in the blood indicates damage to neurons; accumulation of the protein in the brain has been implicated in dementia, Alzheimer disease, and TBI. Similar to Valera, van Donkelaar is exploring objective methods "that will allow us to say what we're seeing in this population is due to traumatic brain injury."

For many survivors that knowledge might be surprisingly reassuring, Mason says. "A lot of women will feel a huge sense of relief to perhaps find out that they have suffered a traumatic brain injury and that there are things that they can possibly do or treatments they can pursue that may help them deal with these challenges." ■

Note: Source references are available through embedded hyperlinks in the article text online.

The JAMA Forum

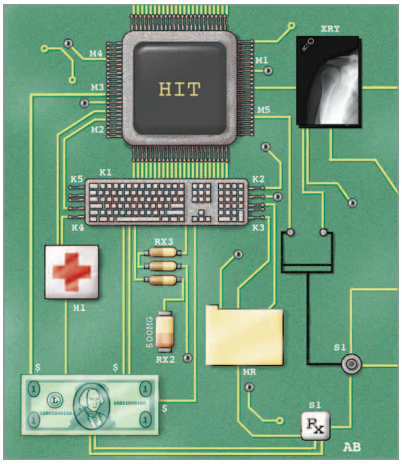
Administrative Costs and Health Information Technology

Elsa Pearson, MPH; Austin Frakt, PhD

Identifying effective and sustainable ways to temper the growth of US health care spending has proved to be challenging. One source of high spending in the United States is administrative costs. Taming them is one approach to bending the cost curve, and health information technology (HIT) has often been considered a promising solution.

Although published 15 years ago, the most cited and comprehensive study on US health care administrative costs suggests they account for about 30% of total health care expenditures. More recent numbers vary but the bottom line is still the same: the United States spends far more than other wealthy nations on health care administration.

The research literature has paid particular attention to billing and insurance-related (BIR) costs, a subclass of administrative costs pertaining to billing and collection of payment for care. The United States' multipayer health care system leads to considerable complexity in this realm. Systems with less BIR complexity—such as the global budgets of Canadian or Scottish hospitals—tend to have lower administrative costs.



BIR costs accounted for almost 17% of total US health expenditures in 2012, or $471 billion. Studies suggest BIR costs add up to a substantial proportion of revenue for individual health systems as well. In 1 academic system, Phillip Tseng, MEd, of Duke University School of Medicine, and colleagues calculated that BIR costs total 14.5% of revenue from primary care visits and more than 25% from discharged emergency department visits. At the clinician level, the researchers found the annual administrative workload of primary care physicians costs nearly $100 000 per physician. Lawrence P. Casalino, MD, PhD, MPH, of Weill Cornell Medical College, and colleagues estimated time spent interacting with insurance plans costs more than $68 000 per physician per year.

Reducing the BIR Cost Burden

Although the burden of BIR costs in the United States is well documented, how to effectively reduce this burden is unclear. Findings from a 2010 study suggest that standardizing BIR protocols could help minimize administrative costs. Others agree.

The range in billing complexity among insurers—public and private—is substantial. These differences, however, demonstrate