

INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

June 27, 2008

Fall-Related Traumatic Brain Injuries Among Oklahomans 65 Years and Older, 2005

Falls among the older population, both nationally and in Oklahoma, are a growing public health problem. As the country's population ages, the problem will continue to worsen. It has been estimated that one-third of older adults fall each year. As an individual ages, the likelihood of experiencing a fall dramatically increases. In Oklahoma and the United States, falls are the leading cause of injury death among individuals aged 65 years and older and the leading cause of traumatic brain injuries (TBIs). Adults over 75 years have particularly high rates of TBI-related hospitalization and death. TBIs are costly injuries that have a multitude of short- and long-term consequences that can affect an individual's independence and ability to perform activities of daily living.

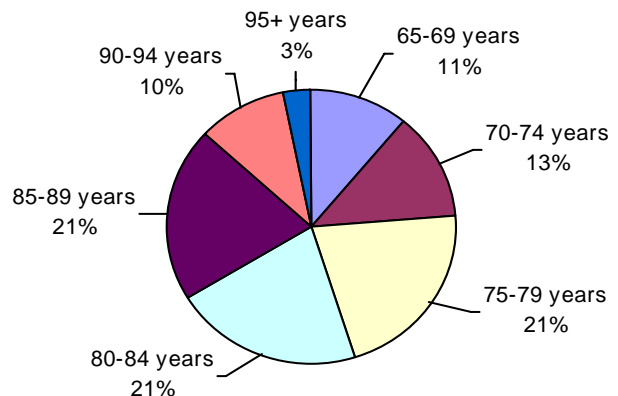
In order to better understand the circumstances and outcomes of TBI in Oklahoma, the Injury Prevention Service selected a sample of all TBI hospitalizations and reviewed the medical records of injured patients who were discharged in 2005. The sample was selected randomly and stratified on hospital size so that the results would be representative of all TBI hospitalizations in Oklahoma. For patients aged 65 years and older whose injury involved a fall, a supplemental form was completed to collect additional details on how and where the injury occurred, as well as comorbidities and other health history and outcomes.

In 2005, a total of 4,395 TBIs resulted in the hospitalization or death of an Oklahoma resident. Falls were the leading cause of these TBIs and older adults had the highest injury rates, particularly those aged 75 years and older. Of this total, 1,370 injuries (31%) occurred in persons 65 years of age or older. Sixty-nine percent of these injuries were falls. Using the sampling procedures described above, 1,029 records of the 4,395 total were successfully reviewed for additional data. Of these sampled records, 290 (28%) met the older adult fall criteria. The remainder of this report describes these 290 sampled cases.

The majority of fall-related injuries occurred among individuals between 75 and 89 years of age (Figure 1). Fifty-eight percent of patients were female. The median age of females was 82 years, while for males, it was 79 years.

More injuries occurred at home than any other location, particularly in bedrooms and bathrooms. Two-thirds of the injuries occurred during the morning and afternoon hours. The most common factors associated with the falls were slipping, tripping, and syncope (i.e., fainting).

Figure 1. Sampled Hospitalized Traumatic Brain Injuries by Age Group Among Persons 65 Years and Older, Oklahoma, 2005



*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10th Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information are also available at <http://ips.health.ok.gov>.

The median length of stay in the hospital was five days. Eighty-six percent of patients had clinical documentation in their records of one or more of the following conditions related to their injury: decreased level of consciousness, amnesia, intracranial lesion, skull fracture, or neurological/neuropsychological abnormality. Fifty-three percent of patients had severe enough injuries that imaging results of the head showed trauma-induced abnormalities; 5% were skull fractures, while nearly 50% were intracranial lesions (e.g., brain contusions, lacerations, hemorrhages, and hematomas). A loss of consciousness was known to have occurred in 28% of the falls; 18% were unconscious over one hour. The majority of patients (57%) had an apparent good recovery with no or only minor deficits; however, 9% died. Of the nonfatal falls, 41% were severe or critical head injuries (Abbreviated Injury Scale scores of 4 or 5).

	History of Falls	No or Unknown History of Falls
Median age	82 years	80 years
Assisted living/nursing home residence prior to admission	34%	24%
GCS* ≤8	9%	3%
AIS** 4-5	50%	39%
Acute intracranial lesion diagnosed***	59%	45%
Skull fracture diagnosed	3%	6%
Documented loss of consciousness	22%	32%
Discharged home	18%	38%
Severe disability or death	22%	14%
*Initial lowest Glasgow Coma Scale score (≤8 indicates coma)		
**Abbreviated Injury Scale Score (4-5 indicates severe or critical injuries)		
***Of those with a CT scan or MRI of the head (95%)		

One important risk factor for falls among older adults is a history of falls. Forty-one percent of males and 39% of females had a documented history of falls. It was found that, in general, patients with a history of falls (regardless of whether or not medical treatment was sought) experienced more severe and debilitating injuries than those without such a history (Table 1). They were also less likely to be discharged home, were slightly older, and were more likely to have resided in an assisted living facility or nursing home prior to admission.

There are a number of medical conditions that can increase an individual's risk of falling and/or complicate recovery. Ninety-seven percent of patients had documentation of a history of one or more selected comorbid conditions (Table 2). In addition, taking multiple medications has been shown to increase the risk of falling. Seventy-nine percent of patients were taking four or more prescription medications at the time of their fall. The use of anticoagulant and antiplatelet medications may put TBI patients at increased risk of hemorrhagic complications. Over one-half of the patients were on anticoagulant therapy at the time of the fall. Twenty-five percent were on aspirin only; 20% were on a prescription anticoagulant; and 12% were on both aspirin and a prescription medication. Patients on anticoagulant therapy stayed an average of one day longer in the hospital.

Health Condition	Percent of Patients with a Documented History of the Condition		
	Male	Female	Total
Alzheimer's disease/dementia	20%	35%	29%
Arthritis	26%	40%	34%
Atrial fibrillation/pacemaker	33%	23%	27%
Cerebrovascular accident/stroke	32%	31%	31%
Depression/bipolar disorder	15%	29%	23%
Diabetes	30%	25%	27%
Hypertension	62%	77%	70%
Incontinence	7%	15%	12%
Osteoporosis	1%	19%	11%
Parkinson's disease	6%	7%	6%
Peripheral neuropathy	3%	4%	3%
Recent acute illness	15%	20%	18%
Seizures/epilepsy	7%	10%	9%
Syncope*	8%	6%	7%
Vision problems	26%	29%	28%
*Does not include syncope related to the most recent fall			

Seventy-two percent of patients were living at a private residence at the time of admission. Of those, 39% were able to return home upon discharge from the hospital. Another 19% also returned home, but with home health services, outpatient rehabilitation, or home hospice. Sixteen percent were discharged to a residential facility, such as a skilled nursing facility or nursing home, and another 14% went to an inpatient rehabilitation facility.

CASE BRIEFS

- A 91-year-old female, who lived alone, tripped and fell, hitting her head on a closet door. The patient was on the floor for three or four hours before being able to crawl to the telephone to call for help. Initially, she refused treatment, but later presented to the hospital disoriented, confused, and agitated. The patient was hospitalized for 12 days before being discharged to a skilled nursing facility.
- An 83-year-old male was filling his bird feeders with seed when he tripped over a root in his backyard and fell. He was found confused and minimally responsive by a relative. After six days in the hospital, he returned home with home health services.
- A 79-year-old male fell while trying to get to a ringing telephone and struck the right side of his head. A chair was reportedly in his way and caused him to trip. His family brought him to the emergency department because he was dazed and on anticoagulant therapy. He was discharged home after a nine-day hospital stay.
- An 83-year-old male was found on the floor by nursing home staff after falling forward out of his wheelchair. He was disoriented and confused. After three days in the hospital, he was discharged back to the nursing home.
- A 76-year-old female was drinking alcohol with friends on New Year's Eve when she fell backwards off a porch, down some steps, and struck her head on a rock. She was diagnosed with a skull fracture and had a blood alcohol level of 0.25 g/dL. The patient required a 20-day hospitalization and home health services after discharge.
- A 70-year-old female was climbing on a step stool to rearrange her kitchen cabinets when she lost her balance and fell backwards. She lost consciousness briefly and required two days in the hospital.

PREVENTION

Successful fall prevention for older adults starts with improving an individual's balance and mobility, making environmental modifications to ensure safe living and working areas, and appropriately identifying and managing medical conditions and medications. Once an individual has a history of one or more falls, the risk is even greater for experiencing a future fall, which necessitates added vigilance in implementing prevention strategies.

The following prevention strategies are some effective ways to lower an individual's chances of falling. Family members, clinicians, caregivers, and service providers should take an active role in promoting these fall prevention messages and assisting older adults in evaluating and modifying their individual risk factors.

- Regular, individually appropriate physical activity/exercise, particularly activities that promote balance and coordination, such as walking, water workouts, and tai chi

- Comprehensive review of all medications (prescription and over-the-counter) by a physician or pharmacist to identify any side effects or combinations that may cause dizziness, drowsiness, or other adverse consequences
- Regular vision examinations and proper use of corrective eyewear
- Home/environmental modifications, such as:
 - Removing trip hazards (e.g., clearing clutter and securing cords)
 - Removing or taping down throw rugs
 - Using grab bars and non-slip mats in the bathroom
 - Moving commonly used items to easily reached locations
 - Wearing properly fitted footwear
 - Improving lighting
 - Ensuring staircases have handrails and lights
- Regular physical examinations and nutritional assessments to diagnose and monitor medical conditions, such as cardiovascular disease/arrhythmias, nutritional deficiencies, balance/gait disorders, and blood pressure

Visit <http://www.cdc.gov/ncipc/duip/preventadultfalls.htm> for more information and resources on preventing falls among older adults.

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