Traumatic brain injury epidemiology

In 2019, relevant articles and registries were identified via systematic review; study quality was higher in the high-income countries (HICs) than in the low- and middle-income countries (LMICs). Sixty-nine million (95% CI 64-74 million) individuals worldwide are estimated to sustain a TBI each year. The proportion of TBIs resulting from road traffic accidents was greatest in Africa and Southeast Asia (both 56%) and lowest in North America (25%). The incidence of RTA was similar in Southeast Asia (1.5% of the population per year) and Europe (1.2%). The overall incidence of TBI per 100,000 people was greatest in North America (1299 cases, 95% CI 650-1947) and Europe (1012 cases, 95% CI 911-1113) and least in Africa (801 cases, 95% CI 732-871) and the Eastern Mediterranean (897 cases, 95% CI 771-1023). The LMICs experience nearly 3 times more cases of TBI proportionally than HICs.

Sixty-nine million (95% CI 64-74 million) individuals are estimated to suffer TBI from all causes each year, with the Southeast Asian and Western Pacific regions experiencing the greatest overall burden of disease. Head injury following road traffic collision is more common in LMICs, and the proportion of TBIs secondary to road traffic collision is likewise greatest in these countries. Meanwhile, the estimated incidence of TBI is highest in regions with higher-quality data, specifically in North America and Europe.

Traumatic brain injury (TBI) is a critical public health and socio-economic problem throughout the world, making epidemiological monitoring of incidence, prevalence and outcome necessary.

Every 15 seconds someone suffers a traumatic brain injury (TBI) in the United States. TBI causes more deaths in males <35 years old than all other diseases combined, and it is estimated that 2% of the U.S. population lives with TBI-associated disability. Despite extensive research and success in animal studies, successful drug therapies have proved elusive in clinical trials.

It is one of leading causes of mortality and disability worldwide and is estimated to surpass many diseases by 2020.

It is the leading cause of mortality and morbidity in children.

Nonaccidental head injury, as seen in domestic child abuse cases, is often associated with spine injury, and spinal subdural hematoma is the most frequent diagnosis. While spinal epidural hematomas are a rare occurrence, the incidence of spontaneous epidural hematomas occurring in nonaccidental head injury patients is even lower.

Epidemiology in China

Sun et al. conducted a nationally representative door-to-door survey in the general population across all age groups in 31 provinces in mainland China in 2013.

All participants were reviewed for a history of physician-diagnosed TBI by trained investigators using a structured questionnaire. TBI survivors were considered as prevalent cases at the prevalent time. The present study also examined the odds of TBI as a function of sex, age, and other demographical variables using logistic regression model. Of 583,870 participants, 2,673 individuals had suffered from a TBI during their past life, yielding a weighted prevalence of being 442.4 (95% CI 342.2-542.6) per 100,000 person. The TBI prevalence increased with increasing age. The present study observed
the multiadjusted ORs of TBI were 1.9 (95% CI 1.8-2.1) for the male, 1.9 (95% CI 1.2-3.1) for the farmers, 1.9 (95% CI 1.2-3.3) for the retiree or homemakers, 3.4 (95% CI 1.5-7.7), and 2.8 (95% CI 1.1-6.6) for those whose education were primary school and high school, respectively. The most common external cause was road traffic accidents among those who were aged 18-34 years old and those whose educational levels were middle school in both genders.

The results indicate TBI was substantially prevalent among Chinese population and underscore the need to develop national strategies to improve the safe education on road and traffic of TBI in rural residents and some subgroup population.

**Epidemiology in the United States**

The Centers for Disease Control and Prevention (CDC) estimate that more than 1.7 million each year in USA sustain TBI. Of these, approximately 1.4 million are treated and released from emergency centers, 275,000 are hospitalized, 80,000 suffer long-term disability and 52,000 die, and another 235,000 are hospitalized for non-fatal TBI.

Incidence of TBI in all industrialized countries is comparable to the U.S., with estimates ranging from 150 to more than 300 per 100,000.

Annual incidence of approximately 250-600 patients per 100,000, and mortality of 17 cases per 100,000.

It is one of the most common causes of death in ordinary accidents, natural disasters, or warfare.

These injuries frequently occur outside, leaving injured individuals exposed to environmental temperature extremes before they are transported to a hospital.

Each year, approximately 100,000 patients require neurosurgical evacuation of an intracranial hematoma in the United States.

There are strong and demographically stable associations between TBI and substance use. These associations may not only increase the odds of injury but impair the quality of post injury recovery.

**Epidemiology in India**

The exact incidence is unavailable in India.

From August 2012 to May 2013 at Department of Neurosurgery, S.C.B. Medical College, Cuttack, Odisha, India. All the pertinent details from case records of hundred and forty-seven children <15 years with TBI were analyzed. Follow-up was done for 6 months at outpatients department.

Age wise, incidence and severity of TBI is more common in 10-15 years. Males outnumber females with a male: female ratio 2.19:1. Overall, road traffic accident (RTA) is the commonest mode of injury. Assault is not uncommon (7.48% cases). Falls is common in <5 years while RTA is common in 5-15 years. The extradural hematoma was the most common injury pattern; however, surgical consideration was maximal for fracture skull. Overall mortality was 7.48%. Diffuse axonal injury has the maximum individual potential for mortality. We noticed excellent recovery in 68.7%, disabilities in 17.68%, and persistent vegetative state in 5.45% cases.

TBI in children carries good outcome, if resuscitated and referred early to a neurotrauma center, and
managed subsequently on an individualized basis with a well-organized team approach. Severe TBI in children has a poor outcome.\textsuperscript{12}

**Epidemiology in Europe**

Traumatic brain injury (TBI) is a common reason for presentation at the emergency department (ED) and hospital admission in Europe.

In total, 28 epidemiological studies on TBI from 16 European countries were identified in the literature. A great variation was found in case definitions and case ascertainment between studies. Falls and road traffic accidents (RTA) were the two most frequent causes of TBI, with falls being reported more frequently than RTA.\textsuperscript{13}

In 2006 it was difficult to reach a consensus on all epidemiological findings across the 23 published European studies because of critical differences in methods employed across the reports.\textsuperscript{14}

**Spain**

**Traumatic brain injury epidemiology in Spain**

2015

A search was conducted in the PubMed electronic database using the terms: epidemiology, incidence, brain injur*, head injur* and Europe. Only articles published in English and reporting on data collected in Europe between 1990 and 2014 were included. In total, 28 epidemiological studies on TBI from 16 European countries were identified in the literature. A great variation was found in case definitions and case ascertainment between studies. Falls and road traffic accidents (RTA) were the two most frequent causes of TBI, with falls being reported more frequently than RTA. In most of the studies a peak TBI incidence was seen in the oldest age groups. In the meta-analysis, an overall incidence rate of 262 per 100,000 for admitted TBI was derived.

Interpretation of published epidemiologic studies is confounded by differences in inclusion criteria and case ascertainment. Nevertheless, changes in epidemiological patterns are found: falls are now the most common cause of TBI, most notably in elderly patients. Improvement of the quality of standardised data collection for TBI is mandatory for reliable monitoring of epidemiological trends and to inform appropriate targeting of prevention campaigns.\textsuperscript{15}

**Romania**

A coordinated strategy to evaluate this public health problem in Romania would first of all rely on a related advanced monitoring system, to provide precise information about the epidemiology, clinical and paraclinical data, but concerning the social and economic connected consequences, too.\textsuperscript{16}

**Traumatic brain injury in skiers**

see 'Traumatic brain injury in skiers'.

**References**


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