



The costs of traumatic brain injury

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Coverage

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- Definition and scale of TBI
- Consequences
- Costs

What is traumatic brain injury?

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- TBI is any injury to the brain caused by impact
- Most common causes are falls, road accidents, collisions and violence
- Injuries are categorised as mild, moderate or severe, depending on duration and depth of unconsciousness
- 85-90% of TBIs classified as mild

Measuring the scale of TBI

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- Incidence v. prevalence
- Multiple incidents
- Different data sources (hospital records, population surveys)

Attendances at A&E

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- In a 6-year local study, TBI was found to account for 3.4% of all A&E attendances
- 10.9% were classified as moderate or severe
- For the UK as a whole, these figures imply a annual total of around 900,000 head injury presentations at A&E, of which 100,000 are moderate/severe

Inpatient admissions

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- Currently running at around 160,000 a year in the UK
- Males account for 62% of total
- Admission rates are highest among people aged 75+ and those aged 0-24
- Total number of admissions up 35% since 2000
- Trends vary greatly by age

Population studies

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- A community sample of c.5,000 people aged 18+ in New Haven, Connecticut, found that 8.5% had experienced a TBI at some time in their lives
- A US modelling study has estimated that 2.0% of the population are living with a TBI-related disability at any one time
- For the UK, this is equivalent to around 1.3 million people

Consequences

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- TBI is the leading cause of death and disability in people aged 1-40 in the UK
- Possible non-fatal consequences include a wide range of physical, cognitive, emotional and behavioural effects...
- ...and consequential changes in lifestyle – unemployment, financial hardship, loss of independence, difficulties in maintaining relationships etc.

Causes of variability in outcomes

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- Severity of injury
- Frequency of injury
- Area of the brain affected
- Age of the patient

Consequences of mild injury

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- Scottish follow-up study of 549 patients aged 14+ admitted to hospital with TBI
- Rates of “good recovery” (resumption of previous lifestyle) one year after injury = 14% for severe cases, 38% for moderate cases and 45% for mild cases
- Follow-up studies at 5-7 and 12-14 years after injury showed continuing high-levels of disability among survivors, with no clear association between initial severity of injury and rates of improvement/deterioration

TBI and premature mortality

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- Increased mortality risk persists well beyond the initial post-injury period
- Swedish longitudinal data show that for victims of TBI the risk of premature death is still 3 x higher than in the general population five years later
- Glasgow study of patients admitted to hospital for TBI in 1996/97 found that more than 40% were dead 13 years later
- Patients with a mild injury were just as likely to die in years 2-13 as those with a moderate or severe injury

TBI and mortality among homeless people

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- A Scottish study found that the occurrence of hospitalised head injury among homeless people was 5 x higher than the population average
- Those with TBI experienced a mortality rate over seven years that was 4 x higher than in the general population and 2 x higher than in homeless people with no history of TBI
- Mortality risk among homeless people aged 15-34 with TBI was 17 x higher than the population average for this age group

TBI and mental health problems (1)

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- Evidence from a range of sources shows a strong association between TBI and mental ill-health, i.e. the prevalence of mental health problems is much higher among people with TBI than in the general population
- The association holds across all major types of psychiatric disorder, including depression/anxiety, psychosis, personality disorders and substance misuse.
- Longitudinal data are needed to clarify the nature of the link between TBI and mental illness, especially in terms of the temporal sequencing

TBI and mental health problems (2)

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- The causal connections between TBI and psychiatric disorder run in both directions, i.e. each is a risk factor for the other
- Swedish longitudinal data indicate that pre-existing mental illness roughly doubles the risk of experiencing TBI; at the same time, rates of new psychiatric diagnoses are nearly twice as high among people with TBI as in the general population
- The causal links going in both directions are particularly strong in relation to TBI and alcohol misuse
- A birth cohort study in Finland has found that TBI during childhood more than doubles the risk of psychiatric disorder in adulthood

TBI and offending (1)

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- Evidence from case studies shows that TBI can result in cognitive and behavioural changes which are well established as risk factors for offending, e.g. reduced impulse control, increased aggression
- A history of head injury is far more common among convicted offenders than in the rest of the population (around 60% in adult offenders and 30% in young offenders, against less than 10% as a population average)
- Again, what is the nature of the association? Are there common underlying factors which result in the same individuals being simultaneously at increased risk of experiencing head injuries and becoming involved in criminal activity?

TBI and offending (2)

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- Longitudinal evidence from a number of countries indicates that TBI is causally implicated in offending to some degree
- A broad central estimate is that a history of head injury increases the likelihood of any type of criminal activity by a factor of around 1.5, after taking into account other possible influences such as family background
- However, the odds increase to around 2.0 for persistent offending and for crimes involving violence

The aggregate costs of TBI (1)

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- Estimates of the aggregate costs of TBI are available for European countries in a Europe-wide study and in studies for the US and Australia
- These vary considerably in methodology, coverage and findings, but in broad terms they suggest that the overall annual cost of TBI in developed countries is equivalent to about 0.8% of annual GDP.
- Applying this ratio to the UK, the aggregate cost of TBI in this country may be estimated at around £15 billion a year.

The aggregate costs of TBI (2)

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- Most of the aggregate cost of TBI in published studies takes the form of output losses in the economy resulting from the adverse impact of TBI on people's ability to work
- The costs of health and social care for the victims of head injury are the next most important component in the total
- The figure of £15 billion for the aggregate cost of TBI in the UK is almost certainly an under-estimate. No allowance is made for: (i) the costs of head injuries that do not result in hospital inpatient admission; (ii) the costs of TBI-related offending; and (iii) the human costs of TBI, i.e. its negative effects on people's wellbeing and quality of life.

Cost per case

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- Adolescence is a peak period for both head injury and offending and so provides a key opportunity for early intervention
- The long-term costs of TBI for a head injury (non-fatal but requiring hospitalisation) incurred by a representative 15-year-old in the general population are estimated at around £155,000
- About a third of these costs are crime-related
- The estimate of £155,000 represents a broad measure of the potential long-term benefits of preventing a single case of head injury at age 15