

# External Causes Associated with Traumatic Brain Injury

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## Abstract

More and better epidemiological data can help in tailoring effective preventive measures against traumatic brain injury, with particular emphasis on reducing the impact of road traffic accidents. The world is facing a silent epidemic of road traffic accidents in the developing countries by 2020, road traffic crashes will have moved from ninth to third place in the world ranking of the burden of disease and will be in second place in developing countries

**Keywords:** Traumatic brain injury; Neurological disorders; Rehabilitation

## Introduction

A lot can be done to reduce the devastating consequences of traumatic brain injuries. Systematic triage of patients can lead to important economic savings and better use of scant hospital resources. More standardized pre-hospital and in-hospital care, to minimize secondary brain injury, can improve outcomes substantially. In mild traumatic brain injury, the mortality rate is below 1%, while 20–50% die after suffering a severe traumatic brain injury. The intermediate category, moderate head injury, implies a mortality rate of 2–5%. Disability is a common problem after hospitalization for traumatic brain injury, even after a mild event traumatic brain injury is the leading cause of death and disability in children and young adults around the world and is involved in nearly half of all trauma deaths. Many years of productive life are lost, and many people have to suffer years of disability after brain injury. In addition, it engenders great economic costs for individuals, families and society. Many lives can be saved and years of disability spared through better prevention [1]. Patients with moderate or severe traumatic brain injury represent less than 10% of all the traumatic head injuries. In this category of traumatic brain injuries, adequate health care can make a difference and substantially improve outcomes. Airway obstruction and falling blood pressure are the acute threats to the vulnerable brain-injured patient. Pre-hospital care with skilled paramedics, early arrival at the scene of the accident, prompt stabilization of the patient's condition in accordance with guidelines, and rapid evacuation reduced overall traumatic brain injury mortality by 24% in two years in san diego. Well-organized and updated hospital inpatient treatment is equally important [2]. On admission, life-supporting measures should be continued, in accordance with advanced trauma life support recommendations.

## Methodology

Simultaneously, a rapid diagnostic overview must be carried out: many patients, particularly in RTA cases, will have concomitant injuries of the chest, abdomen, spine or extremities [3]. In the United Kingdom, the mortality in patients with epidural haematoma declined progressively from 28% to 8% after the introduction of national guidelines for the early management of head injury. The guidelines clearly indicate how patients at risk should be identified and managed before progressive brain damage occurs. A study from the United States in patients with severe traumatic brain injury showed improved outcomes after implementation of evidence-based treatment guidelines [4]. At the same time, reduced hospital costs were obtained through shortened length of stay, from an average of 21.2 days to an average of 15.8 days. Research that focused on identifying the ideal conditions for

the extremely vulnerable brain in severe traumatic brain injuries has resulted in two different approaches in Neuro-intensive care and the perfusion concept [5]. Although they are different in many ways, both have led to improved outcomes in patients with severe traumatic brain injury.

Although disability after mild traumatic brain injury may have been underestimated, most patients will make a good recovery with provision of appropriate information and without requiring additional specific interventions as shown in (Figure 1). Patients with moderate to severe traumatic brain injury should be routinely followed up to assess their need for rehabilitation [6]. There is strong evidence of benefit from formal interventions, particularly more intensive programmes beginning when the patients are still in the acute ward. The balance between intensity and cost effectiveness has yet to be determined. The importance of rehabilitation is consistently underestimated, not least because of its cost. It is a regrettable truth that this part of the treatment lacks the drama of the primary treatment and is consequently more difficult to fund [7]. It is nonetheless of great importance since



Figure 1: Patients followed up to assess their need for rehabilitation.

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traumatic brain injury damages young lives for whom rehabilitation is as important for the regaining of function as primary treatment is for the saving of life.

## Discussion

Neuropsychologists evaluate orientation, attention, intellect, memory, language, visual perception, judgement, personality, mood and executive functions of the patients with traumatic brain injury. Neurological disorders and their sequelae are currently estimated to affect as many as a billion people worldwide [8]. These disorders are found among all age groups and in all geographical regions. Increased life expectancy and reduced fertility have resulted in a demographical transition from predominantly youthful populations to older and ageing ones, causing increases in the neurological disorders such as Alzheimer and other dementias and Parkinson's disease. As a consequence, many low income countries face the double burden of a continuing high level of infections including some that result in neurological disorders and increases in non-communicable diseases. The number of people with neurological disorders is estimated to increase considerably in years to come [9]. It is forecast that the number of people affected by dementia will double every 20 years. While predictions point to higher risk among poor people, children, adolescents and elderly persons, no population group is immune to neurological disorders. Because most of the neurological disorders result in long-term disability and many have an early age of onset, measures of prevalence and mortality vastly understate the disability they cause. Pain is a significant symptom in several neurological disorders and adds significantly to emotional suffering and disability [10]. Even burden estimates combining mortality and disability do not take into account the suffering and social and economic losses affecting patients, their families and the community. The socioeconomic demands of care, treatment and rehabilitation put a strain on entire families, seriously diminishing their productivity and quality of life [11]. The stigma often associated with neurological disorders adds to the social and economic burden. One of the most damaging results of stigmatization is that affected individuals or those responsible for their care may not seek treatment, hoping to avoid the negative social consequences of diagnosis. Indeed, in some communities, the stigma leads to the denial of basic human rights [12]. Stigma aggravates the vicious cycle of illness and social negative reaction and leads to social exclusion and discrimination. Epilepsy, one of the most common neurological conditions, is well understood and accepted in many societies. Yet in many others, particularly in developing countries, epilepsy is considered contagious or the sign of a curse or possession, with blame for the condition attached to the family as well as to the patient [13]. The direct and indirect discriminatory behaviour and factual choices by others cause substantial reduction in societal opportunities such as education, marriage or work, or may result in being excluded from community activities. Fortunately, stigma and its negative effect on quality of life can be substantially reduced by better seizure control, highlighting the need for effective treatment [14]. For many of the neurological disorders there are inexpensive but effective interventions that could be applied on a large scale through primary care as shown in (Figure 2). Phenobarbital for the treatment of epilepsy is one such cost-effective intervention: up to 70% of people with epilepsy could become seizure free with antiepileptic drug treatment, but the proportion remains untreated at any given time is greater than 80% in most low income countries. This massive treatment gap is attributable to a paucity of epilepsy services, trained personnel and antiepileptic drugs. Aspirin is by far the most cost-effective intervention both for treating acute stroke and for preventing a recurrence. It is easily available in developing countries, even in rural areas. Nevertheless, the



**Figure 2:** Effective Interventions applied through primary care.

coverage of the affected population with this inexpensive treatment is still extremely low. One of the important actions required by the health sector is an immunization programme for the prevention of neuro-infections, such as poliomyelitis, and the neurological consequences of infections. Vaccination does not prevent transmission of tuberculosis but is still recommended because of its high protective efficacy against serious forms of the disease in children. A number of strategies implemented at policy level by governments through legislation, tax or financial incentives can reduce risks to health [15]. For example, in the area of road safety, a significant number of people might not choose to drive safely or to use seatbelts or motorcycle helmets, but government action can encourage them to do so, thereby preventing injuries to themselves and to other people. This would also result in prevention of other disorders secondary to trauma such as epilepsy. Control of cardiovascular diseases including stroke can be handled through a comprehensive approach taking account of a variety of interrelated risk factors including blood pressure, cholesterol, smoking, Body-mass index, low levels of physical activity, diet and diabetes. A comprehensive national strategy thus combining prevention, community-based health promotion and access to treatment can substantially decrease the burden associated with cardiovascular diseases, including stroke. Disability consequent to neurological disorders can be decreased by rehabilitation programmes and policies. For example, building ramps and other facilities to improve access by disabled people falls beyond the purview of the health sector but is nevertheless very important for comprehensive management of people with disability.

## Conclusion

The relationship between neurology and public health has not been adequately explored to date. This report provides considerable detail about the increasing global public health importance of various common neurological disorders. Public health interventions that may be applied in an attempt to reduce their occurrence and consequences have been considered. A clear message emerges: unless immediate action is taken globally, the neurological burden is expected to become an even more serious and unmanageable threat to public health.

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## Conflict of Interest

None

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