

# Traumatic brain injury epidemiology in Finland

Recent studies from [Finland](#) have highlighted an increase in the [incidence](#) of [traumatic brain injury](#) (TBI) in [older age](#) groups and high [overall mortality](#). Posti et al. from [Turku](#) performed a comprehensive study on the changing epidemiology of TBI focusing on the acute events in the Finnish working-age population.

Nationwide [databases](#) were searched for all emergency ward [admissions](#) with [traumatic brain injury diagnosis](#) for persons of 16-69 years of age during 2004-2018.

In the Finnish working-age population, there were 52,487,099 person-years, 38,810 TBI-related hospital admissions, 4664 acute neurosurgical operations (ANO), and 2247 cases of in-hospital mortality (IHM). The TBI-related hospital admission incidence was 94/100,000 person-years in men, 44/100,000 in women, and 69/100,000 overall. The incidence rate of admissions increased in women, while in men and overall, the rate decreased. The incidence rate increased in the group of 60-69 years in both genders. Lowest incidence rates were observed in the age group of 30-39 years. The occurrence risk for TBI admission was higher in men in all age groups. Trends of ANOs decreased overall, while decompressive craniectomy was the only operation type in which a rise in incidence was found. Evacuation of acute subdural hematoma was the most common ANO. Mean length of stay and IHM rate halved during the study years.

In Finland, the epidemiology of acute working-aged TBI has significantly changed. The rates of admission incidences, ANOs, and IHM nowadays represent the lower end of the range of these acute events reported in the western world <sup>1)</sup>.

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Nationwide databases were searched for all admissions with a [TBI](#) diagnosis and later for deaths of persons  $\geq 16$  years of age during 2004-2018. The search included all hospitals that provide acute TBI care in [Finland](#).

The study period included 69,231 TBI-related hospital admissions (men = 62%). We found that for men, the highest rate of TBIs occurred on Saturdays, whereas women experience the highest rate of TBIs on Mondays. The highest rate of TBIs in men occurred in July, while women experienced the highest rate of TBIs in January. TBI-related hospital admissions (incidence risk ratio [IRR] 1.090, 95% CI 1.07-1.11,  $p < 0.0001$ ) and mortality within 30 days after TBI (hazard ratio [HR] 1.057, 95% CI 1.001-1.116,  $p = 0.0455$ ) were more common on public holidays and weekends than on weekdays. There was an increasing trend in the proportion of TBI-related hospital admissions occurring on public holidays and weekends from 2004 (31.5%) to 2018 (33.4%) ( $p = 0.0007$ ). In summer months, TBI-related hospital admissions (IRR 1.10, 95% CI 1.08-1.12,  $p < 0.0001$ ) and 30-day mortality (HR 1.069, 95% CI 1.010-1.131,  $p = 0.0211$ ) were more common than in other months. TBIs occurred more often in younger and healthier individuals on these index days and times. In terms of specific public holidays, the TBI risk was overall higher on New Year's Eves and Days (IRR 1.40, 95% CI 1.25-1.58,  $p < 0.0001$ ) and Midsummer's Eves and Days (IRR 1.36, 95% CI 1.20-1.54,  $p < 0.0001$ ), compared to nonworking days. This finding was significant in both genders.

TBI-related hospital admissions and mortality were more common on public holidays, weekends, and in summer months in Finland. People who sustained TBIs on these days were on average younger and

healthier. The occurrence of TBIs on public holidays and weekends is increasing at an alarming rate <sup>2)</sup>.

<sup>1)</sup>

Posti JP, Luoto TM, Sipilä JOT, Rautava P, Kytö V. Changing epidemiology of traumatic brain injury among the working-aged in Finland: Admissions and neurosurgical operations. Acta Neurol Scand. 2022 Mar 7. doi: 10.1111/ane.13607. Epub ahead of print. PMID: 35257358.

<sup>2)</sup>

Posti JP, Kytö V, Sipilä JOT, Rautava P, Luoto TM. High-Risk Periods for Adult Traumatic Brain Injuries: A Nationwide Population-Based Study. Neuroepidemiology. 2021 Apr 14:1-8. doi: 10.1159/000515395. Epub ahead of print. PMID: 33853074.

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