Psychopathology, Population Health, and Genetics Lab:
Project Proposal Form

Provisional paper title:
Longitudinal associations of mental disorders with accidental injuries:
Nationwide-registry analysis

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Objective of the study:
We have previously shown that mental disorders are associated with the subsequent onset of chronic physical diseases in the population.[1] It remains unknown, however, whether these associations extend to other physical-health problems. The present analysis will evaluate whether mental disorders also forecast accidental injuries in the population. We have three primary aims:

Aim 1: To test whether mental disorders are associated with subsequent accidental injuries, across a 26-year period.

Aim 2: To test whether associations are evident for different types of psychiatric conditions, and for different types of injuries.

Aim 3: To test whether associations are evident across age and sex.

Data analysis methods:
Study population: Our study population will be drawn from the New Zealand Integrated Data Infrastructure (IDI), a collection of multiple de-identified administrative data sources that are linked at the individual level by a common spine.[2] We will assess 10-year cohorts born from 1930-39 to 1980-89. We will follow individuals for 26 years, from 1994-2020 (age during 26-year period = 5-90 years).

Ascertaining mental disorders: We will assess mental disorders using diagnostic codes from public-hospitalization records, following a previously-published ascertainment scheme.[1] Mental disorders will comprise nine broad categories of disorders (substance-use, psychotic, mood, neurotic, physiological-disturbance, personality, developmental, behavioral, and unspecified disorders), as well as self-harm behavior.

Ascertaining accidental injuries: We will assess accidental injuries using (a) information about insurance claims for injuries recorded by the Accident Compensation Corporation (ACC), (b) diagnostic codes for injury-related admissions from public-hospitalization records, and (c)

accident-flag codes from outpatient and emergency-department records (National Non-Admitted Patient Collection).

Descriptive analyses: We will calculate (a) the prevalences of both mental disorders and injuries, and (b) the prevalence of injuries among individuals with vs. without a mental disorder.

Tests of association: We will use Poisson regression models with relative risks to estimate the association between mental disorder and any subsequent injury. We will use Cox proportional hazards models to estimate the association between mental disorder and the first subsequent injury (time to the first injury event). We will use negative-binomial regression models to estimate the association between mental disorder and the accumulation of accidental injuries (number of different injury events, number of different injury types). We will control for injuries that occurred before individuals' first diagnosed mental disorder. Analyses conducted in the total population will control for birth year and sex.

Robustness and sensitivity analyses. We will: (1) test whether associations hold across sex, age, mental-disorder type, and injury type; (2) compare associations when including vs. excluding assault injuries; (3) test whether associations are robust to exclusion of NNPAC data (as the data are only available for a portion of the observation period); and (4) compare results when using weighted vs. unweighted data.

Accounting for differential observation time: To account for differing durations of observation time between those with a mental disorder (observed from their first hospitalization for a mental disorder) and those without a mental disorder (observed across 26 years for all individuals without a mental disorder), we will randomly assign observation periods to controls to match the observation durations among cases.[1] We will weight the data based on time spent alive and in the country, to account for any remaining differences in observation time between individuals owing to death or outmigration.

Note: Described above are the pre-planned analyses. Additional analyses may be added as suggested through internal and external peer review and will be identified as secondary in the manuscript.

Data / measures needed:

- Public-hospitalization records (MOH_HOSPITAL_DISCHARGES)
  - From July 1994 to June 2020
- Injury-claims records (ACC)
  - From July 1994 to June 2020
- National Non-Admitted Patient Collection records (MOH_NNPAC)
  - From January or July 2007 (earliest available) to June 2020

Significance of the study (for theory, research methods, or clinical practice):
Injuries are a persistent public-health problem. They incur considerable direct healthcare costs, as well as indirect costs including time lost from work.[3,4] Prior research has provided important information about the role of mental disorders in risk for accidental injury. However, studies have tended to focus on just one mental disorder at a time, with most research concerning risk associated with ADHD and use of drugs and alcohol.[5–8] Studies that have considered a broader range of mental disorders include design limitations, including reliance on small samples[9] and retrospective reports.[10] Further, it remains unclear how risk for injuries as a function of mental disorders may vary across the lifespan. The present study will address these gaps. Results

could inform epidemiologic models of the association between mental and physical health, as well as public-health and policy efforts to reduce the population burden of injuries.

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