Differences in prevalence of pre-existing morbidity between injured and non-injured populations

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Objectives To identify and examine differences in pre-existing morbidity between injured and non-injured population-based cohorts.

Methods Administrative health data from Manitoba, Canada, were used to select a population-based cohort of injured people and a sample of non-injured people matched on age, gender, Aboriginal status and geographical location of residence at the date of injury. All individuals aged 18–64 years who had been hospitalized between 1988 and 1991 for injury (*International Classification of Diseases, Ninth Edition, Clinical Modification* (ICD-9-CM) code 800–995) ($n = 21\,032$), were identified from the Manitoba discharge database. The matched non-injured comparison group comprised individuals randomly selected 1:1 from the Manitoba population registry. Morbidity data for the 12 months prior to the date of the injury were obtained by linking the two cohorts with all hospital discharge records and physician claims.

Results Compared to the non-injured group, injured people had higher Charlson Comorbidity Index scores, 1.9 times higher rates of hospital admissions and 1.7 times higher rates of physician claims in the year prior to the injury. Injured people had a rate of admissions to hospital for a mental health disorder 9.3 times higher, and physician claims for a mental health disorder 3.5 times higher, than that of non-injured people. These differences were all statistically significant ($P < 0.001$).

Conclusion Injured people were shown to differ from the general non-injured population in terms of pre-existing morbidity. Existing population estimates of the attributable burden of injury that are obtained by extrapolating from observed outcomes in samples of injured cases may overestimate the magnitude of the problem.

Keywords Wounds and injuries/epidemiology/complications; Comorbidity; Causality; Health services/utilization; Cost of illness; Retrospective studies; Cohort studies; Canada (*source: MeSH, NLM*).

Mots clés Plaies et traumatismes/épidémiologie/complication; Morbidité associée; Causalité; Services santé/utilisation; Coût maladie; Etude rétrospective; Etude cohorte; Canada (*source: MeSH, INSERM*).

Palabras clave Heridas y lesiones/epidemiología/complicaciones; Comorbilidad; Causalidad; Servicios de salud/utilización; Costo de la enfermedad; Estudios retrospectivos; Estudios de cohortes; Canadá (*fuente: DeCS, BIREME*).

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Introduction

WHO has predicted that injury will be the second leading cause of the world disease burden by the year 2020 (*1*, *2*). A limitation in the current process of deriving population estimates of the burden attributable to injury is the failure to take into account pre-existing morbidity. If injured people differ from the general population in terms of pre-existing morbidity, then observed outcomes in injured samples that are attributed to injury may in part be due to pre-existing morbidities rather than to the injury in question.

The Australian Burden of Disease study acknowledged the importance of co-existing conditions in estimating the attributable burden of particular conditions (*3*). Mathers et al. (*3*) concluded that several methodological issues relating to comorbidity remain to be addressed if burden of disease models are to be advanced. These issues include how comorbidities affect long-term disability; which comorbidities are relevant; and how to deal with the logistics of modelling large numbers of combinations of comorbidities (*3*).

Although some attempts have been made to look at differences in health status in patients pre- and post-injury using self-reported retrospective recall (*4*), investigators using this method acknowledge inevitable biases (*5–9*). Bias is better managed by ascertaining pre-injury morbidity at a point in time before the injury was sustained. Although rare in injury outcome studies (*10*, *11*), the use of comorbidity indices based on administrative claims data recorded prior to the index event is well established in other fields of research such as cancer, cardiovascular disease and diabetes (*12–14*).

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Global burden of disease estimates currently assume that the distribution of morbidity in the community is independent of injury status. Outcome studies of clinical case series cannot test this assumption and few population-based studies that compare injured and non-injured people have been reported in the literature (*10*). The present study used administrative health databases to compare the frequency and distribution of morbidity in people in the 12 months prior to their sustaining an injury with the health status of the general non-injured population.

Methods

Study design

The study described in this paper is an examination of the prevalence of pre-existing disease in two samples drawn from administrative health data from Manitoba, Canada. The two samples were originally identified on the basis of exposure to injury, for the purposes of conducting a matched, population-based retrospective cohort study, with a follow-up period of 10 years. The University of Manitoba Research Ethics Board and the Health Information Privacy Committee of Manitoba Health approved this study. Data extractions were completed by Manitoba Health and all identifying variables were removed from the data before the study investigator was granted access to them.

Data sources

The province of Manitoba provides universal health-care coverage for a population of 1.14 million residents (*15*). Manitoba Health maintains databases of claims made by health providers for reimbursement of services (hospital, physician and extended-care services), as well as a population registry of those eligible for health coverage (*16*). Virtually every resident of Manitoba is covered by the provincial health-care plan (*15*). The databases have been used extensively in health research and are described in detail elsewhere (*17*, *18*).

Setting and participants

A cohort of injured people (n = 21 032) was identified as all persons aged 18–64 years resident in the province of Manitoba, who had been hospitalized for treatment of an injury between 1 January 1988 and 31 December 1991. The cohort members included all individuals who had an *International Classification of Diseases, Ninth edition, Clinical Modification* (ICD-9-CM) code 800–995 (excluding late effects from injury 905–909, and allergies from within 995), in the first or second diagnostic fields. For individuals who had more than one injury-related hospital admission during the study period, the first admission was designated as the index case record.

For each injured subject, a non-injured person was randomly selected from the Manitoba population registry and matched on age, gender, aboriginal status and geographical location of residence at the date of admission of the index case. Excluded from both the injured and non-injured cohorts were residents of nursing homes, patients in extended hospital care and people who had not been resident in the province for 12 months prior to the admission date of the index record (for the purposes of extracting baseline data).

Health service utilization and measurement of comorbidity

Information on health service utilization was extracted from hospital discharge data and physician services claims for both the injured and non-injured cohorts. Dates of admissions, services, treatment, diagnostic and discharge information were extracted for the 12-month period prior to the date of the index record for all matched pairs (*19*). Physician claims were restricted to ambulatory claims, including outpatient, emergency department (where available) and visits to medical practitioners in the community (*20*, *21*). For individuals with multiple hospital records associated with a single episode (e.g. when inter-hospital transfers or readmissions had taken place), they were integrated into one summary record. Frequency and types of pre-existing comorbid conditions for the two cohorts were determined from the extracted hospital and physician claims during the pre-injury period. For the purpose of identifying pre-existing comorbidities, only the primary diagnostic field was used, and conditions were categorized according to the 18 disease chapters of ICD-9-CM. The number of comorbid conditions was counted by summing the number of different disease categories present. Data on comorbid conditions from physician claims were derived using the same method.

The Dartmouth-Manitoba version of the Charlson Comorbidity Index (CCI) (*22*) was also used to quantify pre-existing comorbidity. The CCI was computed for the injured cohort based on 12 months of hospital data for the year preceding the index injury record. For the non-injured cohort, the CCI was calculated for the 12-month period prior to date of injury of the matched case. If no comorbid conditions were found, or where no hospital records existed, the CCI score was set to zero.

Injury classification

The injured were analysed as the total cohort and by the nature of injury codes (ICD-9-CM 800–995). Seven subgroups (brain injury, spinal injury, burns, long-bone fractures, poisonings, internal injuries and other) were created across subchapter headings to enable more comprehensive examination of those injury types commonly studied in injury outcomes research. ICDMAP-90 © software from Johns Hopkins University was used to generate an Injury Severity Score (ISS) for injured cases. These ISS scores were grouped into minor (ISS 1–8), moderate (ISS 9–15) and severe (ISS $\geqslant$ 16) categories in accordance with the convention (*23*). ICDMAP-90 © maps a severity score for only a proportion of the total Injury and Poisonings ICD-9-CM codes. Therefore not all injured cases were scored.

Analysis

Analysis of data involved univariate and bivariate statistics. The statistical significance of differences between groups and subgroups was assessed by chi-squared statistics for categorical data and with the Mann–Whitney U test for continuous data because of non-normal distributions. Rate ratio confidence intervals were adjusted for matching variables using Poisson regression methods. All tests were two sided with a 5% level of significance. Rates of health service utilization were reported using person-years (PYs) of exposure time. Analysis was conducted using SAS version 8.2 statistical software.

Results

Sample characteristics

The characteristics of the 21 032 injured cases are shown in Table 1. The mean age at the start of follow-up for both injured and non-injured cohorts was 35.7 years. Males represented almost two-thirds of the cohort and more injuries occurred in individuals in the younger age categories (18–34 years). Of the injury subgroups, fractures of long bones (12%), poisonings (10.3%) and brain injury (6.1%) were the most common. An ISS was generated for 62% of the total injured (*n* = 17 002). Over 85% of scored cases were of minor severity, 10% of moderate severity and almost 4% were classified as major injuries.

Pre-existing morbidity for injured sample

Members of the injured cohort had a 1.9 times higher rate of hospital admissions in the 12 months before the date of the index record than members of the non-injured cohort (injured 276/1000 PYs and non-injured 148/1000 PYs). The mean number of hospital admissions per person in the pre-injury year was 0.12 in the injured (range 0–19) and 0.09 in the non-injured cohort (range 0–12). The mean length of stay in hospital differed significantly between the two cohorts in the pre-injury year (Table 2). Injured people were less likely to be admitted as day patients (28.6% versus 36.3%) and more likely to have a total length of stay greater than 14 days (13.3% versus 5.7%).

The injured cohort had a 1.7 times higher rate of physician claims in the pre-injury period (670/100 PYs, average 3.9 claims per person) than the non-injured cohort (387/100 PYs, average 2.2 claims per person). A greater percentage of the injured cohort (65%) than of the non-injured cohort (48%) had three or more physician claims in the 12-month pre-injury period (Table 2).

Significantly more people from the injured cohort (5.9%) than from the non-injured cohort (1.2%) had CCI scores of 1 or more (Table 3). Overall, a greater percentage of injured people had comorbidities, and they had more comorbidities per person than the members of the non-injured cohort, based on hospitalizations and physician claims. Injured people had an average of 2.2 different conditions (range 0–14) for which they had consulted a physician in the pre-injury year, whereas in the non-injured people this figure was 1.5 (range 0–13). There were 1498 people in the injured group and 423 in the non-injured cohort, who had a moderate or severe pre-existing mental health condition, as indicated by health service use in the pre-injury period.

The members of the injured cohort had higher rates of hospital admissions and physician claims for all causes in the pre-injury period than those in the non-injured cohort (Table 4 and Table 5). The rate ratios were 1.5 or greater for 14 of the 18 chapters for hospital admissions and for six chapters for physician claims. When ranked by rate ratio, for both hospital admissions and physician claims, the greatest differences were seen for mental health disorders and previous injuries. Injured people had a 9.3 times higher rate of admissions to hospital for a mental health disorder (injured 42/1000 PYs and non-injured 4.5/1000 PYs) and a 3.5 times higher rate of mental health physician claims (injured 98/100 PYs) than the non-injured people (28/100 PYs). Mental disorders were the most frequent cause of all hospital admissions for the total injured cohort. Almost half of the mental health admissions were for alcoholic psychoses, affective psychoses and schizophrenic disorders. Over 80% of all mental health physician claims for the injured cohort were for "non-psychotic or personality disorders", more specifically for such conditions as panic, anxiety or depression.

During the pre-injury period, the injured cohort had a 3.7 times higher rate of admissions to hospital for a previous injury (injured 9.9/1000 PYs and non-injured 2.7/1000 PYs)

Table 1. **Demographic characteristics for injured and non-injured cohorts, injury subgroups and injury severity scores at the time of the case index injury admission**

	Injured (*n* = 21 032)		Non-injured (*n* = 21 032)	
	n	%	*n*	%
Gender				
Male	13 441	63.9	13 441	63.9
Female	7 591	36.1	7 591	36.1
Age in years[a]				
18–24	5 410	25.7	5 422	25.7
25–34	6 014	28.6	5 990	28.6
35–44	3 959	18.8	3 972	18.8
45–54	2 805	13.3	2 799	13.3
55–64	2 844	13.5	2 849	13.5
Place of residence[a]				
Urban	8 687	41.3	8 799	41.9
Rural	8 167	38.8	8 208	39.0
Remote	4 178	19.9	4 025	19.1
Injury subgroups				
Brain injury	1 290	6.1		
Spinal injury	95	0.5		
Burns	524	2.5		
Fractures of long bones	2 515	12.0		
Poisonings	2 169	10.3		
Internal injuries	593	2.8		
Other injuries	13 846	65.8		
Injury Severity Score (ISS)[b]				
Minor (ISS 1–8)	14 599	85.9		
Moderate (ISS 9–15)	1 746	10.3		
Severe (ISS ⩾ 16)	657	3.8		

[a] Age-matched on year of birth and place of residence on partial postcode, thus there are small differences in actual numbers of injured and non-injured.
[b] ISS not computed for 4030 cases.

and a 2.7 times higher rate of physician claims for injury-related matters (117/100 PYs) than the non-injured group (43/100 PYs). Nineteen per cent of the previous injury-related admissions for the injured cohort (and 10% for the non-injured) were for self-inflicted harm or suicide attempts by poisoning. Nineteen per cent of the previous physician injury claims for the injured group (and 28% for the non-injured) were for sprains and strains.

Pre-existing morbidity by injury type

Health service use in the 12-month pre-injury period was similar across the injury types analysed. However, members of the injured cohort hospitalized for poisonings were notable in that they only accounted for 10% of the injured, but accounted for 24% of all admissions and 20% of all physician claims in the pre-injury period. Furthermore, this group had a 59 times higher rate of hospital admissions (95% confidence interval (CI), 27.75–123.64) and an 11 times higher rate of physician claims (95% CI, 10.38–12.0) for mental health disorders than their matched counterparts in the uninjured group. Over 50% of the hospital admissions for mental health problems and 78% of physician claims for the poisonings group in the pre-injury

Table 2. **Hospital admissions, length of stay and physician claims in the 12-month period prior to the index admission for injured and non-injured cohorts**

Health service use for the 12 months prior to injury	Injured (21 032)		Non-injured (21 032)		Significance
	n	%	*n*	%	
Total hospital admissions	5 804	100	3 111	100	
Admissions per person					
No admissions	17 316	82.33	18 665	88.75	
1 admission	2 569	12.21	1 879	8.93	$P < 0.0001$[a]
2 admissions	698	3.32	360	1.71	
3 admissions	236	1.12	78	0.37	
4 or more admissions	213	1.01	50	0.24	
Mean number of admissions (range)[c]	0.12	(0–19)	0.09	(0–12)	$P < 0.0001$[b]
Total length of stay in hospital (days)					
Day patient	1 062	28.58	859	36.29	
1–2	625	16.82	363	15.34	
3–4	575	15.47	473	19.98	$P < 0.0001$[a]
5–7	543	14.61	329	13.90	
8–14	416	11.19	208	8.79	
15–29	281	7.56	79	3.34	
30 days or more	214	5.76	56	2.37	
Mean length of stay in days (range)[c]	0.36	(0–248)	0.18	(0–258)	$P < 0.0001$[b]
Total physician claims	140 986	100	81 302	100	
Claims per person					
No claims	2 746	13.06	5 137	24.42	
1–2 claims	4 685	22.28	5 864	27.88	
3–5 claims	5 328	25.33	5 082	24.16	$P < 0.0001$[a]
6–10 claims	4 342	20.64	3 246	15.43	
11–20 claims	2 736	13.01	1 396	6.64	
21–50 claims	1 064	5.06	286	1.36	
51 or more claims	131	0.62	21	0.10	
Mean number of claims (range)[c]	3.9	(0–295)	2.2	(0–127)	$P < 0.0001$[b]

[a] Determined by χ^2 statistics.
[b] Determined by Mann–Whitney *U* test.
[c] Geometric mean calculated due to non-normal distributions.

year were for non-psychotic, neurotic or personality disorders — often for specific anxiety or depressive disorders. The poisonings group had significantly more hospital admissions in the pre-injury year for previous injuries and poisonings (rate ratio (RR) = 11.5; 95% CI, 4.14–31.95), circulatory diseases (RR = 6.2; 95% CI, 3.22–11.52) and ill-defined conditions (RR = 4.7; 95% CI, 2.82–7.26) than the matched subgroup. This injury group also had higher rates of physician claims for ill-defined conditions (RR = 3.4; 95% CI, 3.12–3.60), neoplasms (RR = 2.9; 95% CI, 2.27–3.77), digestive diseases (RR = 2.7; 95% CI, 2.39–2.96), than the matched subgroup. Excluding poisonings from the analysis had little effect on the statistical significance of differences between health service utilization by the members of the injured and non-injured cohorts during the pre-injury period.

Discussion

To the best of our knowledge, this is the first study to quantify a difference in pre-existing morbidity between injured and non-injured populations. Compared to non-injured people, injured people were almost five times as likely to have a CCI score of one or more, were admitted to hospital at almost twice as often, and had 1.7 times the rate of physician claims. The injured cohort had fewer members with no comorbid conditions and significantly more members with greater numbers of different conditions present than did the matched sample from the general population. The results of this study support the concern that current burden of injury estimates may be inaccurate if the influence of pre-existing ill-health is not taken into account.

Although few studies reported in the literature have been similar in scope and methods to the current study (*3*), one key population-based study of elderly people with and without hip fractures, did find similar results (*10*). This study found that, prior to their injury, the study subjects had significantly higher comorbidities using the CCI, higher disability measures and were more likely to be residents of nursing homes than controls (*10*).

Several studies of clinical injury outcome have measured comorbidities using a number of different methods, mostly relying on the diagnostic fields of the index admission record (*7*, *8*, *24*). These studies have found a consistent association between the presence of comorbid conditions and increased risk of mortality following injury. Smaller and less consistent associations were found in the few studies that have considered comorbidity and non-fatal outcomes (*25–27*).

Table 3. **Comorbid conditions in the 12-month period prior to the index admission for injured and non-injured cohorts**

Comorbid conditions for the 12 months prior to injury	Injured (21 032)		Non-injured (21 032)		Significance
	n	%	*n*	%	
Charlson Comorbidity Index					
No comorbidity	19 797	94.12	20 778	98.79	$P < 0.0001$[a]
1 or more comorbidity	1 235	5.87	254	1.21	
Comorbid conditions per person (based on hospital admissions)					
No comorbidities	17 316	82.33	18 665	88.75	
1 comorbidity	3 004	14.28	2 110	10.03	$P < 0.0001$[a]
2 comorbidities	571	2.71	224	1.06	
3 or more comorbidities	141	0.67	33	0.16	
Mean number of conditions (range)[c]	0.15	(0–6)	0.09	(0–6)	$P < 0.0001$[b]
Comorbid conditions per person (based on physician claims)					
No comorbidities	2 746	13.06	5 137	24.42	
1 comorbidity	3 838	18.25	4 750	22.58	
2 comorbidities	4 018	19.10	3 959	18.82	$P < 0.0001$[a]
3 comorbidities	3 341	15.89	2 904	13.81	
4 comorbidities	2 604	12.38	1 944	9.24	
5 or more comorbidities	4 485	21.32	2 338	11.12	
Mean number of conditions (range)[c]	2.2	(0–14)	1.5	(0–13)	$P < 0.0001$[b]

[a] Determined by χ^2 statistics.
[b] Determined by Mann-Whitney *U* test.
[c] Geometric mean calculated due to non-normal distributions.

Table 4. **Hospital admissions per 1000 person-years for all ICD-9-CM disease chapters during the 12-month period prior to the injury, for the injured and matched non-injured cohort, ranked by rate ratios**

ICD-9-CM chapters	Rate of hospital admissions per 1000 PYs[a]		Adjusted rate ratio[b]	95% confidence intervals
	Injured *n* = 21 032	Non-injured *n* = 21 032		
Mental health disorders	42.03	4.52	9.31	7.53–11.50
Injury and poisonings	9.98	2.71	3.68	2.73–4.90
Blood diseases	1.76	0.52	3.36	1.71–6.57
Endocrine and metabolic	7.56	2.71	2.79	2.05–3.75
Musculoskeletal diseases	18.59	7.13	2.61	2.16–3.15
Nervous system diseases	12.31	5.23	2.35	1.88–2.94
Ill-defined conditions	18.50	8.04	2.30	1.91–2.74
Respiratory diseases	16.78	8.46	1.98	1.65–2.36
Circulatory diseases	13.12	7.70	1.70	1.40–2.07
Supplementary classification	15.12	9.56	1.58	1.32–1.89
Congenital anomalies	0.81	0.52	1.55	0.73–3.31
Skin diseases	12.41	8.04	1.54	1.27–1.87
Digestive diseases	32.05	21.11	1.52	1.34–1.71
Infectious diseases	3.57	2.38	1.50	1.04–2.13
Genitourinary diseases	22.97	15.74	1.46	1.26–1.67
Complications of pregnancy	36.80	33.00	1.12	1.01–1.24[c]
Neoplasms	11.60	10.56	1.10	0.91–1.32
Conditions of perinatal period	0.00	0.00	NA	NA

[a] PYs = person years.
[b] Adjusted for age, gender and place of residence.
[c] Unadjusted confidence interval.

Table 5. **Physician claims per 100 person-years for all ICD-9-CM disease chapters during the 12-month period prior to the injury, for the injured and matched non-injured cohort, ranked by rate ratios**

ICD-9-CM chapters	Rate of physician claims per 100 PYs[a]		Adjusted rate ratio[b]	95% confidence intervals
	Injured n = 21 032	Non-injured n = 21 032		
Mental health disorders	98.15	28.05	3.50	3.40–3.61
Injury and poisonings	117.41	43.23	2.72	2.65–2.78
Ill-defined conditions	61.21	33.72	1.82	1.76–1.87
Musculoskeletal diseases	63.74	36.18	1.76	1.71–1.81
Digestive diseases	30.29	18.72	1.62	1.55–1.68
Blood diseases	3.48	2.27	1.53	1.36–1.72
Nervous system diseases	43.69	30.85	1.42	1.37–1.46
Congenital anomalies	0.67	0.47	1.41	1.09–1.83
Respiratory diseases	71.26	51.52	1.38	1.35–1.42
Endocrine and metabolic	23.67	17.14	1.38	1.32–1.44
Genitourinary diseases	40.66	29.67	1.37	1.33–1.42
Skin diseases	33.17	24.85	1.33	1.29–1.38
Infectious diseases	15.37	11.72	1.31	1.24–1.38
Neoplasms	5.75	4.52	1.27	1.17–1.39
Circulatory diseases	29.11	24.10	1.21	1.16–1.25
Supplementary classification	31.49	28.44	1.11	1.07–1.15
Complications of pregnancy	1.20	1.08	1.11	0.92–1.32[c]
Conditions of perinatal period	0.03	0.04	0.75	0.26–2.18

[a] PYs = person-years.
[b] Adjusted for age, gender and place of residence.
[c] Unadjusted confidence interval.

This study identified two areas of importance for estimating the attributable burden of injury. The first is that injured people have significantly more hospital admissions and physician claims prior to their injury, across almost every disease classification, than do the general population. The differential was most pronounced for hospitalizations for which 14 of the 18 chapters had rate ratios of 1.5 or greater, whereas six of the 18 chapters for physician claims had rate ratios of 1.5 or greater. When ranked by the rate ratios, two disease chapters, mental health disorders and previous injuries, consistently had the highest rates of hospital admission and physician claims. The finding regarding mental health is consistent with a previous study of trauma patients, which found that more than 30% of trauma patients were affected by psychiatric morbidity before the trauma event, and that psychiatric conditions represented 18% of the total morbidity (*9*). Outcome studies of the mental health consequences of injury should consider controlling for pre-existing conditions before ascribing mental health disorders as a consequence of the injury.

Second, there was no single injury subgroup that accounted for the overall differences in the prevalence of pre-existing disease. However, the poisonings subgroup had greater absolute and relative morbidity in almost all ICD-9-CM disease chapters and had the highest rate ratio for mental health admissions when compared with the findings in non-injured counterparts. The poisonings subgroup tended to be younger, female and had made greater use of health services for treatment of non-psychotic, neurotic or personality disorders. Nevertheless, excluding this group from the analysis had little effect on the overall findings. Health service use following an admission for poisoning, if considered solely as a consequence of that injury admission does not take account of the high baseline service use that would most likely have continued irrespective of the poisoning event.

Aspects of the methodology need to be considered as possible study limitations. First, "health service use" was used as a proxy for health status. Although previous studies conducted in this study population have supported the validity of this practice (*21*, *28*), it does entail several assumptions about the equity of access to health services, patterns of referral, and service delivery being dependent on health status and consistent across all subsections of the community. Second, the generalizability of the findings may be compromised by injured cases being defined as those hospitalized during the study period. This excludes injuries that did not lead to hospitalization and pre-hospital fatalities, and may be biased by issues of service access and referral pathways (*29*). Third, is the question of whether incident cases could be accurately identified from the administrative databases used to select the injured cohort. Of the 21 032 people in the injured sample only 60 had been admitted in the previous 12 months for an injury with the same ICD-9 injury group code. Of these, 24 were cases of poisoning with repeat admissions mostly occurring after a number of months, and are likely to have been new episodes rather than repeat admissions for the original injury, leaving only 36 cases (i.e. 0.17%) which could potentially have been misclassified as incident cases. Finally, examination of the six categories of injury type, while justified on the basis that they are the groups most relevant to injury outcomes research, accounts for only 35% of all the cases. Further breakdown of the "other" category for the purposes of analysis created a number of small categories and did not contribute information relevant to the aims of the study.

There are many strengths which set this study apart from previous studies that have included consideration of comorbidity in their examination of injury outcomes. The injured group in this study is a population-based incidence sample and as such, avoids the biases inherent in most clinical study samples. This is one of the few studies to have included a population-based non-injured comparison group. The sample size of the injured group was sufficiently large to enable a considerable degree of analysis of injury subgroups, which will provide a rich context for future work in the field. Of principal value has been the ability to measure health status prior to injury in the injured sample, and previous health status in the non-injured group. Through the use of administrative data, analysis of the 12-month pre-injury period circumvents the recall bias noted previously, which has hampered attempts to identify pre-injury health status. This study has shown that clarifying the contribution of pre-existing morbidity, to enable the refined calculation of population attributable-burden estimates, is vitally important in burden-of-disease approaches to public health policy. ■

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Résumé

Comparaison de la morbidité pré-existante entre des populations de personnes ayant été victimes d'un traumatisme et ne l'ayant pas été

Objectif Identifier et étudier les différences de morbidité pré-existante entre des cohortes en population de personnes ayant été victimes d'un traumatisme et ne l'ayant pas été.

Méthodes Les auteurs ont utilisé les données sanitaires administratives du Manitoba, Canada, pour sélectionner une cohorte en population de personnes ayant subi un traumatisme et un échantillon de personnes n'en ayant pas subi, appariées selon l'âge, le sexe, l'origine autochtone ou non et le lieu de résidence à la date du traumatisme. Ils ont identifié, à partir de la base de données de décharge hospitalière du Manitoba, tous les individus âgés de 18 à 64 ans ayant fait l'objet d'une hospitalisation pour traumatisme entre 1988 et 1991 [*Classification internationale des maladies, neuvième édition, Modification clinique* (ICD-9-CM) codes 800 à 995] (n = 21 032). Les auteurs avaient constitué le groupe de comparaison, composé de personnes n'ayant pas subi de traumatisme appariées, en choisissant au hasard, dans un rapport 1/1, des individus dans le registre de population du Manitoba. Ils ont obtenu les données de morbidité pour les 12 mois précédant la date du traumatisme en mettant en relation les deux cohortes avec l'ensemble des registres de décharge hospitalière et des demandes de remboursement de soins médicaux.

Résultats Par rapport au groupe de personnes n'ayant pas subi de traumatisme, les individus victimes d'un traumatisme présentaient des valeurs plus fortes de l'indice de comorbidité de Charlson, des taux d'hospitalisation 1,9 fois plus élevés et des taux de remboursement de soins médicaux 1,7 fois plus élevés dans l'année précédant le traumatisme. Les personnes ayant subi un traumatisme présentaient un taux d'hospitalisation pour troubles mentaux 9,3 fois plus élevé et des taux de demande de remboursement concernant des troubles mentaux 3,5 fois plus élevés que les personnes n'ayant pas été victimes d'un traumatisme. Ces différences étaient toutes statistiquement significatives ($p < 0,001$).

Conclusion Les auteurs ont montré que les personnes victimes de traumatisme différaient de la population générale n'ayant pas subi de traumatisme par la morbidité pré-existante. Les estimations en population disponibles de la charge de traumatisme attribuable à la morbidité pré-existante, obtenues par extrapolation des résultats observés sur des échantillons de cas de traumatismes, peuvent surestimer l'ampleur du problème.

Resumen

Diferencias en la prevalencia de morbilidad previa entre poblaciones de traumatizados y no traumatizados

Objetivo Identificar y analizar las diferencias en la morbilidad preexistente entre cohortes poblacionales de personas traumatizadas y no traumatizadas.

Métodos Se usaron los datos administrativos sanitarios de Manitoba (Canadá) para seleccionar una cohorte poblacional de personas traumatizadas y una muestra de personas no traumatizadas apareadas por edad, sexo, aboriginalidad y lugar geográfico de residencia en la fecha del traumatismo. Se identificó en la base de datos de altas de Manitoba a todos los individuos de 18 a 64 años que habían sido hospitalizados entre 1988 y 1991 a causa de traumatismos (*Clasificación Internacional de Enfermedades, 9ª revisión, Modificación Clínica* (CIE-9-MC) códigos 800–995) ($n = 21\ 032$). El grupo de comparación de no traumatizados apareados estaba integrado por individuos seleccionados al azar, en proporción 1:1, a partir del registro de población de Manitoba. Se obtuvieron los datos de morbilidad correspondientes a los 12 meses previos a la fecha del traumatismo, para lo cual se relacionaron las dos cohortes con todos los registros de altas hospitalarias y las facturas de los médicos.

Resultados En comparación con el grupo de no traumatizados, para las personas traumatizadas se hallaron puntuaciones mayores del Índice de Comorbilidad de Charlson, tasas de ingreso hospitalario 1,9 veces mayores, y tasas de facturación de médicos 1,7 veces superiores durante el año previo al traumatismo. Las personas traumatizadas presentaban tasas de ingreso hospitalario por trastornos de salud mental 9,3 veces superiores, y en su caso las facturas médicas por tales trastornos eran 3,5 veces mayores que las de los no traumatizados. Todas esas diferencias eran estadísticamente significativas ($P < 0,001$).

Conclusión Las personas traumatizadas diferían de la población no traumatizada en cuanto a la morbilidad preexistente. Las actuales estimaciones poblacionales de la carga atribuible de traumatismos, obtenidas extrapolando a partir de los resultados observados en muestras de personas traumatizadas, podrían estar sobrestimando la magnitud del problema.

ملخص

الفروق في معدل انتشار المراضة السابقة الوجود بين المجموعات السكانية المصابة وغير المصابة

الغرض: تحديد واختبار الفروق في معدل انتشار الأمراض السابقة للإصابة بين الأتراب من المجموعات السكانية المصابة والمجموعات غير المصابة.

الطريقة: استُخدمت معطيات صحية إدارية من ولاية مانيتوبا الكندية، لاختيار أتراب من مجموعة سكانية من المصابين، وعينة أخرى من غير المصابين المتماثلين في العمر والجنس والأصل العرقي والموقع الجغرافي للإقامة في تاريخ الإصابة. وتم الاستعانة بقواعد المعطيات الخاصة بتخريج المرضى في مانيتوبا لتحديد أفراد الفئة العمرية 18 إلى 64 عاماً الذين أدخلوا المستشفيات في الفترة من عام 1988 إلى 1999 بسبب الإصابة وفق التصنيف الدولي للأمراض، الطبعة التاسعة، التعديل السريري ICD-9-CM الراموز 800 إلى 995، وبلغ عددهم 032 21 فرداً. وكانت مجموعة المقارنة المماثلة التي تتألَّف من غير المصابين تتكوَّن من أفراد تم انتقاؤهم بشكل عشوائي بنسبة 1 إلى 1 من السجلات السكانية لولاية مانيتوبا. وتم الحصول على معطيات المراضة التي وقعت خلال 12 شهراً السابقة لتاريخ الإصابة عن طريق الربط بين الأتراب من المجموعتين وبين جميع سجلات تخريج المرضى في المستشفيات ومطالبات بأجور الأطباء.

النتائج: بمقارنة مجموعة المصابين مع مجموعة غير المصابين، تبيَّن أن مجموعة المصابين سجلت أحرازاً أعلى في منسب شارلسون للمراضة المشتركة، ومعدلات أعلى للإدخال في المستشفيات بلغت 1.9 ضعفاً، ومعدلات أعلى لمطالبات الأطباء بأجورهم بلغت 1.7 ضعفاً، وذلك في العام السابق للإصابة. كما بيَّنت الدراسة أن المصابين سجلوا معدلاً أعلى للإدخال في المستشفيات بسبب الاضطرابات الصحية النفسية بلغ 9.3 ضعفاً، وكانت مطالبات الأطباء المتعلقة باضطرابات الصحة النفسية أعلى بنسبة 3.5 أضعاف بالمقارنة مع غير المصابين. وتُعتبر جميع هذه الفروق ذات أهمية إحصائية (معامل الدقة أقل من 0.001).

الحصيلة: تختلف مجموعة السكان المصابين عن مجموعة غير المصابين من حيث إصابتهم بالأمراض الوجود. وقد تؤدي التقديرات السكانية الموجودة للأعباء التي تُعزى إلى الإصابات، والتي يمكن الحصول عليها بالاستقراء من النتائج الملاحظة في عينات الحالات المصابة، إلى المبالغة في تقدير حجم المشكلة.

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