Injury-related health services use and mortality among Métis people in Alberta

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Abstract

Objectives To examine injury-related health services use, defined as hospital admissions and emergency department (ED) visits, as well as mortality among Métis people in Alberta, and to compare those results with the entire Alberta population.

Methods This population-based descriptive epidemiological research used administrative data maintained by the Alberta Ministry of Health (AH), for the year 2013. Hospital morbidity data and Alberta Vital Statistics registry were extracted and included a unique personal number to identify individuals across multiple records. To identify injury and mortality cases among the Métis people in Alberta, administrative databases were linked to the Métis Nation of Alberta (MNA) Identification Registry. Age-standardized rates of injury-related health services usage and mortality were calculated and compared between Métis people and the entire Alberta population.

Results Age-standardized incidence rates (ASIRs) of all causes combined of injury-related visits to the ED and hospital admissions were 35% ($p < 0.01$) and 26% ($p = 0.05$) higher among Métis people compared with the overall Alberta population. Among the MNA, ASIRs of health service use were higher in rural areas ($p < 0.01$) and among men ($p < 0.01$). The injury-related mortality rate was not significantly higher among the MNA compared with the Alberta population. However, among the MNA, Métis males had a significantly higher injury mortality rate than females ($p < 0.02$).

Conclusion Results from the current study suggest that injuries are a concern among Métis people. Health planners should design and implement strategies directed to reduce the burden of injury and associated complications for Métis people, especially in rural areas and among Métis males.

Résumé

Objectifs Examiner l'utilisation des services de santé (hospitalisations et visites aux urgences) et la mortalité liées aux traumatismes chez les Métis de l'Alberta et comparer ces résultats à ceux de l'ensemble de la population albertaine.

Méthode Pour cette étude épidémiologique populationnelle descriptive, nous avons utilisé les données administratives du ministère de la Santé de l'Alberta pour l'année 2013. Nous avons extrait les données sur la morbidité hospitalière et les statistiques de l'état civil de l'Alberta, qui incluent un numéro personnel unique permettant d'identifier les personnes d'un dossier à l'autre. Pour recenser les cas de traumatismes et de mortalité chez les Métis de l'Alberta, nous avons maillé les bases de données administratives au registre des Métis de la Nation métisse de l'Alberta (NMA). Nous avons calculé les taux d'utilisation des services de santé et de mortalité liés aux traumatismes, normalisés selon l'âge, et nous avons comparé les taux pour les Métis à ceux de l'ensemble de la population albertaine.

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Résultats Les taux d'incidence normalisés selon l'âge (TINA) des visites aux urgences et des hospitalisations liées aux traumatismes chez les Métis, toutes causes confondues, étaient supérieurs de 35 % ($p < 0,01$) et de 26 % ($p = 0,05$) aux taux pour l'ensemble de la population albertaine. Dans la NMA, les TINA de l'utilisation des services de santé étaient plus élevés en milieu rural ($p < 0,01$) et chez les hommes ($p < 0,01$). Le taux de mortalité lié aux traumatismes n'était pas significativement plus élevé dans la NMA que dans la population albertaine. Par contre, dans la NMA, les hommes métis présentaient un taux de mortalité lié aux traumatismes significativement plus élevé que celui des femmes ($p < 0,02$).

Conclusion Les résultats de l'étude indiquent que les traumatismes chez les Métis sont un sujet d'inquiétude. Les planificateurs des services de santé devraient concevoir et appliquer des stratégies pour alléger le fardeau des traumatismes et les complications associées chez les Métis, particulièrement en milieu rural et chez les hommes.

Keywords Métis · Injuries · Mortality · Health services

Mots-clés Métis · Traumatismes · Mortalité · Services de santé

Introduction

Injury is a major public health issue in terms of costs and diminished quality of life both nationally and provincially. In Canada, approximately 14,500 deaths (6.4% of all deaths) were caused by injury in 2005 (Statistics Canada 2009) and 4.27 million people aged 12 or older (15% of the population in this age range) suffered an injury severe enough to limit their activities of daily living in 2009–2010 (Billette and Janz 2011). Alberta has above-average injury rates compared with most other provinces in Canada (Parachute Canada 2015). The province experiences approximately 1,612 potential years of life lost per 100,000 people which represents a loss of over 1,700 lives at a cost of over 4 billion dollars each year (Parachute Canada 2015).

Surveillance has indicated that Indigenous peoples have similar injury patterns compared to the general population, but with higher rates. A comparison of Indigenous and non-Indigenous populations in Calgary, Alberta, found that injuries occurred 3.7 times more often among the adult Indigenous population and had higher median injury severity scores (Karmali et al. 2005). Previous studies have found that Indigenous peoples have 3 to 6 times higher rates of injury death compared with the Canadian average (Health Canada 2001; Harrop et al. 2007). This high rate extends into childhood and youth, where the risk of death due to suicide or homicide has been found to be 6.6 and 5.1 times higher among Indigenous children (Harrop et al. 2007). Research in British Columbia has also indicated a high burden among Indigenous groups indicated by higher rates of hospitalization for injuries, with particularly high rates for intentional injuries (Brussoni et al. 2016; George et al. 2017; Jin et al. 2015; Brussoni et al. 2018). In the same line, compared with non-Indigenous peoples, injury-related mortality risk ratios were 2.65 and 1.89 among Métis males and females, respectively (Tjepkema et al. 2009). Possible factors contributing to a high incidence of injury in Indigenous peoples include isolated residence, the physical environment, crowded and dilapidated housing

conditions, lifestyle, education, occupational risk, and poor social and economic conditions (Health Canada 2001; George et al. 2017; Brussoni et al. 2018; Brussoni et al. 2015; Jin et al. 2017; George et al. 2016).

More recent studies have shown that the burden of injury among Indigenous peoples is decreasing and the gap with non-Indigenous people has been narrowing in British Columbia (Brussoni et al. 2016; Jin et al. 2015; Brussoni et al. 2018; George et al. 2015). Injury hospitalizations among the Indigenous peoples of British Columbia decreased by 64.8% between 1986 and 2010 compared with a 52.6% decline across the entire province (Brussoni et al. 2016). However, a significant gap still remained between the two populations in British Columbia.

Previous studies have shown that injuries represent a major cause of morbidity and mortality in Indigenous populations (Allard et al. 2004; Clapham et al. 2006; Stevenson et al. 1998; Tjepkema 2005); however, in Alberta, only First Nations people have been studied (Alberta Centre for Injury Control and Research 2005) and there is scarce information available about the burden associated with injury among the Métis population, specifically. The Métis National Council defines Métis as “a person who self-identifies as a Métis, is distinct from other Indigenous peoples, is of historic Métis Nation ancestry, and is accepted by the Métis Nation” (Métis National Council 2019). Data from the National Household Survey (NHS) show that 451,795 Canadians who reported Indigenous ancestry identified themselves as Métis in 2011. This represented 32.3% of the total Indigenous population and 1.4% of the total Canadian population (Statistics Canada 2011). Research that does not differentiate between Métis, First Nations, and Inuit will obscure the distinctiveness of these populations and their health needs. Consequently, further studies describing health problems among Métis people are required to design and implement effective preventive strategies and interventions adjusted to the needs of this population. Therefore, the aim of this

research is to examine injury-related health service use (hospital admissions and ED visits) and mortality among Métis people and to compare those results with the entire population of Alberta.

Methods

Data source

This population-based research used provincial data maintained by Alberta Health (AH), the health ministry of the government of Alberta, for the year 2013. Provincial health electronic databases were linked using the Alberta Health Care Insurance Plan Central Stakeholder Registry which included records of all the individuals covered under Alberta's universal publicly funded insurance scheme. Diagnosis of injury was based on the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) (World Health Organization 2005). Hospital discharge abstract data were used to estimate the incidence rate of injury-related inpatient hospitalizations, and the ambulatory care database was used to estimate the visits to the ED in Alberta. Adverse event injuries were excluded from the analysis. One person can have one or more hospitalizations and/or visits to the ED due to the same or different causes of injury. Injury-related mortality data were obtained from the Alberta vital statistics registry. To identify injury and mortality cases among the Métis Nation of Alberta (MNA), administrative health databases were linked probabilistically using name (first, middle, and last), birth date, and sex with the MNA Identification Registry, supplied by the MNA. This method successfully links 97% of the registry (source: unpublished data from Alberta Health). Compared with Statistics Canada estimates for Alberta Métis, the Métis identified in the registry tend to be older with a noticeable undercounting of individuals under the age of 25 (Supplemental Table 1) (Statistics Canada 2013). The sex distribution was similar to that found by Statistics Canada. All the information that might identify individuals was kept confidential. Ethical approval for this multi-year, retrospective review of Alberta data was obtained from the Health Research Ethics Board (HREB) at the University of Alberta.

Statistical analysis

Among Métis people and in the Alberta population, injury-related age-standardized incidence rates of health services usage (visits to the ED and hospitalizations) and the mortality rate during 2013 were calculated per 100,000 population. Z-tests were used to compare rates between (1) Métis people and Alberta's population, and among Métis people (2) living in rural vs urban area, and (3) males vs females. Statistical

significance was accepted at $p < 0.05$. The data analyses for this paper were generated using SAS® software.

Results

Data from 4,007,203 people (49% females) living in Alberta in 2013 were included in the current study; of these, 23,518 (51% females) were registered as Métis. A larger percentage of Métis people lived in rural areas, compared with all Albertans (27% vs 15%). The age distribution was similar for Métis and the Alberta population.

Injury-related visits to the emergency department

Métis people in Alberta had a higher percentage of injury-related visits to the ED compared with the total population of Alberta (20% vs 14%) (Table 1). The age-standardized incidence rate (ASIR) of all causes of injury visits to the ED among Métis people was 35% higher than in the Alberta population during the period studied ($p < 0.01$) (Table 2). In addition, ASIRs were significantly higher among Métis people compared with ASIRs in the Alberta population for several causes of injury such as unintentional falls, struck by/against object/person, sports-related injuries, overexertion/strenuous movement, cutting/piercing, motor vehicle traffic, natural and environmental factors, suffocation/foreign body/choking, and all-terrain/other off-road motor vehicles (Table 2).

Among Métis Albertans, unintentional falls were the main cause of injury-related visits to the ED, with a higher ASIR observed in adults aged 70 or older. The incidence rate (IR) of visits to the ED due to all causes of injury combined among Métis was 51% higher in rural areas compared with that in urban ones ($p < 0.01$). Similarly, IRs of specific injury-related visits to the ED due to unintentional falls, struck by/against object/person, sports-related injuries, overexertion/strenuous movement, cutting/piercing, motor vehicle traffic, natural and environmental factors, suffocation/foreign body/choking, violence and injury purposely inflicted, and other road vehicles were higher in rural settings. Conversely, IRs of unintentional poisoning and suicide/self-inflicted injury were significantly higher in urban areas (Table 2).

In Alberta, Métis males had 40% higher IR of injury-related visits to the ED than Métis females ($p < 0.001$). Métis males showed statistically significant higher IRs across many types of injuries. They tended to have higher rates for injuries associated with sports, vehicles, machinery, and violence. They also were more likely to be treated for some broad unintentional injury types such as cutting/piercing injuries, choking/suffocation, and being struck by or against an object or person. Métis females had higher IRs of unintentional falls and suicide/self-inflicted injury than Métis males. Other

Table 1 Characteristics of the population

Population living in Alberta, 2013			
		All Albertans*	Métis people in Alberta
	<i>n</i>		
Females, <i>n</i> (%)		4,007,203	23,518
		1,971,301 (49.19)	11,952 (50.82)
Rural area, <i>n</i> (%)		606,866 (15.14)	6295 (26.77)
Age groups (years), <i>n</i> (%)			
< 25		1,267,629 (31.63)	7429 (31.59)
25–34		672,023 (16.77)	4045 (17.20)
35–44		579,029 (14.45)	3265 (13.88)
45–54		577,015 (14.40)	4089 (17.39)
55–64		462,980 (11.55)	2711 (11.53)
65–74		253,410 (6.32)	1408 (5.99)
75+		195,117 (4.87)	571 (2.43)
Injury-related visits to the emergency department (ED) [†] , <i>n</i> (rate)		518,592 (129 per 1000)	4225 (180 per 1000)
Injury-related hospitalizations [†] , <i>n</i> (rate)		34,513 (8.6 per 1000)	209 (8.8 per 1000)
Injury-related deaths, <i>n</i> (%)		1950 (0.05)	16 (0.07)

*Including Métis people

[†] The same person can have multiple events. Excluding adverse events

Data sources: Alberta Health Care Insurance Plan Central Stakeholder Registry, Ambulatory Care Database, Hospital Discharge Abstract Database, and Vital Statistics

causes of injury should be interpreted cautiously due to a small number of events (Table 2).

Injury-related hospital admissions

The ASIR of all causes of injury was 26% higher among Métis Albertans than in the overall Alberta population ($p = 0.05$) (Table 3); however, there were no significant differences in ASIRs of injury-related hospital admissions between the Métis compared with the Alberta population (Table 3). Injury-related hospital admissions among Métis Albertans were mainly associated with unintentional falls, which were especially found in adults aged 85 or older and was the exclusive cause of injury among those aged 90 and over. Other major causes of injury-related hospital admissions include vehicle traffic accidents and suicide/self-inflicted injuries (Table 3).

The IR of injury-related hospital admission among Métis people was 51% higher in rural areas compared with that in urban areas ($p < 0.001$). Incidence rate of unintentional falls was significantly higher in rural areas, while incidence rates of suicide and self-inflicted injuries were higher in urban settings. Differences in other causes of injuries should be interpreted cautiously due to the low number of events occurred by location (Table 3).

Métis males had 34% higher IR of all cause of injury-related hospital admission compared with Métis females; however, this difference was not significant ($p = 0.06$). Métis

males had significantly higher IRs of all-terrain or other off-road motor vehicle accidents, and non-significant higher IRs for motor vehicle accidents and violence/injury purposely inflicted events. Métis females tended to have higher IRs of unintentional falls and suicide/self-inflicted injury-related hospital admission, though the differences were not statistically significant (Table 3).

Injury-related mortality

There were no significant differences in the injury-related mortality rate between Métis people and the total Alberta population ($p = 0.89$) or between rural and urban areas among Métis people during the period studied ($p = 0.20$). Among Métis, IR of injury-related mortality was over 3 times higher in males compared with that in females ($p = 0.02$) (Table 4).

Discussion

This study explored the burden of injury among Métis people living in Alberta. A higher incidence of injury-related visits to the ED was found among Métis people compared with the total population of Alberta. Moreover, results from the current study also indicate that incidence of injury-related health service use by Métis people was higher in rural areas than in urban ones and among Métis males compared with females. No statistically significant differences

Table 2 Incidence rate of injury-related visits to the emergency department among Métis people and Albertans, 2013

Injury indicator	Cause of injury	Age-standardized incidence rate			Crude incidence rate of emergency department visits among Métis					
		MNA	Alberta*	<i>p</i> value	Location			Gender		
					Rural [‡]	Urban	<i>p</i> value	Female	Male	<i>p</i> value
	All injury (excluding adverse events) [†]	17,880	13,230	< 0.01	24,350	16,150	< 0.01	15,000	21,030	< 0.01
1	Unintentional falls	4170	3310	< 0.01	4480	3520	< 0.01	4060	3510	< 0.01
2	Struck by or against objects/persons	1810	1440	< 0.01	2340	1550	< 0.01	1360	2210	< 0.01
3	Sports-related injuries	1650	1060	< 0.01	1860	1570	< 0.01	830	2550	< 0.01
4	Overexertion/strenuous movement	1410	1100	< 0.01	1890	1410	< 0.01	1410	1680	0.17
5	Cutting/piercing	1320	970	< 0.01	1870	1280	< 0.01	1050	1870	< 0.01
6	Motor vehicle traffic	880	610	< 0.01	1060	960	< 0.01	990	1020	1.00
7	Natural and environmental factors	790	570	0.04	1190	670	0.04	880	740	0.17
8	Suffocation/foreign body/choking	740	530	0.02	950	680	< 0.01	430	1090	< 0.01
9	Violence and injury purposely inflicted	620	500	0.24	700	670	< 0.01	400	1040	< 0.01
10	Other road vehicle	440	290	0.12	600	350	0.03	290	540	< 0.01
11	All-terrain or other off-road motor vehicle	380	170	0.03	520	280	0.08	190	510	< 0.01
12	Unintentional poisoning	350	320	0.71	320	340	< 0.01	340	350	0.91
13	Fire and flames	290	160	0.16	410	210	0.17	220	320	0.17
14	Suicide and self-inflicted injury	220	160	0.52	170	250	< 0.01	310	160	0.01
15	Machinery	130	120	0.92	240	120	0.40	60	240	< 0.01
16	Motor vehicle non-traffic	100	60	0.63	110	90	0.06	110	100	0.68
17	Undetermined whether unintentionally or purposely inflicted (excluding poisonings)	50	50	0.97	100	60	0.32	80	60	0.62
18	Motor vehicle boarding/alighting	50	50	0.99	80	40	0.56	30	70	0.25
19	Water transport	50	10	0.69	60	50	0.25	10	100	< 0.01
20	Late effects	50	20	0.77	30	20	0.41	10	40	0.10
21	Operations of war/legal intervention	20	10	0.92	20	20	0.32	0	40	0.09
22	Drowning	10	0	0.96	20	10	0.56	0	30	0.25
23	Vehicle incidents not elsewhere classified	20	10	0.93	20	10	0.56	0	30	0.25
24	Air and space transport	0	0	–	0	10	0.86	10	0	0.65
25	Firearms	0	10	0.97	0	10	0.86	0	10	0.65
26	Railway	0	0	–	20	0	0.65	10	0	0.65
27	Other classifiable	40	30	0.90	50	50	0.08	20	90	0.02
28	Other/unspecified	2290	1680	< 0.01	3240	1920	< 0.01	1930	2650	< 0.01

Italics indicates a statistically significant result ($p < 0.05$)

*Including Métis people. [†] The same person can have multiple events. [‡] 40 events were deleted because of unclear postal codes. Incidence rate per 100,000 population

Data sources: Alberta Health Care Insurance Plan Central Stakeholder Registry, Ambulatory Care Database

were found in the incidence of injury-related hospital admission or mortality among Métis people compared with the Alberta population during the study period.

The current study is one of the first studies exploring injury-related health services use (hospital admissions and ED visits) and mortality among Métis people. The higher incidence of injury-related visits to the ED found among Métis people compared with the total population of Alberta is in line with previous studies that compared health service use between Indigenous and non-Indigenous peoples

(Karmali et al. 2005; Harrop et al. 2007; Brussoni et al. 2016; Tjepkema 2005; Alberta Centre for Injury Control and Research 2005; Costa et al. 2008). This study also agrees with prior research that has found that Indigenous males are more likely to be treated for intentional injuries compared with Indigenous females (George et al. 2017). In this study, this is due to violence-related injuries, specifically.

However, this study failed to find a significantly higher rate of deaths due to injury among the Métis. The low base rate of deaths by injury in a general population and the small size of the

Table 3 Incidence rate of injury-related hospital admissions among Métis people and Albertans, 2013

Injury indicator	Cause of injury	Age-standardized incidence rate			Crude incidence rate of hospital admissions among Métis					
		MNA	Alberta*	<i>p</i> value	Location			Gender		
					Rural [‡]	Urban	<i>p</i> value	Female	Male	<i>p</i> value
	All injury (excluding adverse events) [†]	1040	820	0.05	1180	780	< 0.01	760	1020	0.06
1	Unintentional falls	480	380	0.33	410	300	< 0.01	370	290	0.26
2	Motor vehicle traffic	80	60	0.83	190	50	0.51	60	120	0.13
3	Suicide and self-inflicted injury	60	50	0.90	50	80	< 0.01	100	40	0.09
4	Violence and injury purposely inflicted	50	40	0.85	60	30	0.53	30	60	0.21
5	All-terrain or other off-road motor vehicle	40	20	0.87	80	20	0.74	0	80	0.01
6	Sports-related injuries	40	30	0.95	50	30	0.32	30	40	0.74
7	Unintentional poisoning	40	30	0.94	0	50	0.15	30	40	0.74
8	Late effects	30	10	0.85	30	30	0.16	30	40	0.48
9	Other road vehicle	30	20	0.91	30	30	0.16	20	50	0.16
10	Struck by or against objects/persons	30	20	0.95	20	20	0.18	–	40	0.09
11	Overexertion/strenuous movement	10	20	0.91	0	20	0.49	–	30	0.15
12	Undetermined whether unintentionally or purposely inflicted (excluding poisonings)	10	10	0.95	30	10	1.00	30	10	0.32
13	Cutting/piercing	20	10	0.97	20	10	0.56	10	20	0.56
14	Fire and flames	20	10	0.85	30	0	0.41	10	20	0.56
15	Firearms	10	0	0.93	20	10	1.00	10	10	1.00
16	Machinery	10	0	0.98	20	10	1.00	–	20	0.40
17	Motor vehicle boarding/alighting	10	0	0.96	30	0	0.41	20	–	0.41
18	Natural and environmental factors	10	10	0.96	30	0	0.41	10	10	1.00
19	Motor vehicle non-traffic	0	0	0.98	20	0	0.65	0	10	0.65
20	Suffocation/foreign body/choking	0	20	0.88	0	10	0.86	0	10	0.65
21	Air and space transport	0	0	1.00	0	0	–	0	0	–
22	Drowning	0	0	0.99	0	0	–	0	0	–
23	Operations of war/legal intervention	0	0	0.99	0	0	–	0	0	–
24	Railway	0	0	1.00	0	0	–	0	0	–
25	Vehicle incidents not elsewhere classified	0	0	1.00	0	0	–	0	0	–
26	Water transport	0	0	0.99	0	0	–	0	0	–
27	Other classifiable	0	0	0.98	0	0	–	0	0	–
28	Other/unspecified	60	50	0.92	60	40	0.37	30	70	0.13

Italics indicates a statistically significant result ($p < 0.05$)

*Including Métis people. [†] The same person can have multiple events. [‡] 2 events were deleted because of unclear postal codes. Incidence rate per 100,000 population

Data sources: Alberta Health Care Insurance Plan Central Stakeholder Registry, Hospital Discharge Abstract Database

Métis sample restrict the power of this analysis. Hospitalization rates were also not significantly different, which may be partially due to a small Métis sample. It may also be due to a narrowing gap in hospitalizations among Métis in recent years, which would align with other research indicating that these health gaps are narrowing for Indigenous peoples as a whole (George et al. 2015). It also failed to find significant differences between the Métis and other Albertans with respect to intentional injuries.

In Alberta, unintentional falls in older people have been identified as a major public health problem to the point that

direct efforts have been made to tackle this cause of injury (Injury Prevention Centre 2014). Nevertheless, results from the current study have shown that falls represent a significant health burden among Métis people. It is therefore recommended that fall-prevention strategies directed at older Métis, especially females in rural areas, be implemented. Additional primary prevention interventions should be directed to decrease the incidence of other causes of injury (i.e., educational campaigns encouraging safety practises such as wearing protective gear while working or participating in sports).

Table 4 Injury-related mortality rate among Métis people and Albertans, 2013

Injury indicator	Injury	Age-standardized mortality rate			Crude mortality rate among Métis people					
		Métis	Alberta*	<i>p</i> value	Location			Gender		
					Rural [†]	Urban	<i>p</i> value	Female	Male	<i>p</i> value
	Any injury	60	50	0.89	160	30	0.20	30	100	0.02
1	Suicide and self-inflicted injury	20	10		50	10		10	30	
2	Motor vehicle traffic	20	10		50	10		10	30	
3	Undetermined whether unintentionally or purposely inflicted (excluding poisonings)	20	10		50	10		10	30	
4	Drowning	0	0		20	0		0	10	
5	Violence and injury purposely inflicted	0	0		0	10		0	10	

Italics indicates a statistically significant result ($p < 0.05$)

*Including Métis. [†] 40 events were deleted because of unclear postal codes. Incidence rate per 100,000 population

Data sources: Alberta Health Care Insurance Plan Central Stakeholder Registry, Vital Statistics

Primary prevention offers the most cost-effective strategy for controlling the burden associated with injuries and the consequences accompanying them. It involves either preventing the injury events from occurring or mitigating the severity of injury incurred (Holder et al. 2001). To motivate active engagement and participation from the MNA, we suggest involving representatives from the MNA in the designing of culturally oriented interventions directed to their community (Castro et al. 2010).

Some limitations of the current study should be considered. First, the MNA population was identified using the MNA Identification Registry. This list is comprised only of Métis people who have registered with the MNA. Consequently, it likely does not capture all people with Métis ancestry living in Alberta and may not represent the overall Métis population within the province. Compared with the census estimates, the MNA members tended to be older. Second, because the registered MNA population is small, there were a relatively small number of events for some causes of injury studied. Small numbers of events might represent a methodological limitation which prevents us from drawing strong conclusions due to a lack of statistical power; therefore, although some of the differences between the groups compared were significantly different, the results should be interpreted cautiously. Third, this study only used one year of data and therefore is unable to examine trends over time in the two populations. This also limited the power when testing for differences in injury mortality between the two populations when combined with the small Métis sample, and the low rate of mortality in general populations. The main strength of this study was the use of high-quality provincial health administrative data that were collected in a standardized fashion. Furthermore, collaboration by researchers and the Alberta Government with the Métis Nation of Alberta is another strength of the current study.

This study attempts to cover the gap in information available on injury among Métis people. Our results provide health planners with valuable evidence helpful for the design and

implementation of strategies directed at reducing the burden of injury and the complications associated with it among Métis people. Further study of the determinants and risk factors associated with the higher injury-related health services use among Métis people should also be planned.

Conclusion

Results from the current study suggest that injuries are important health concerns to be addressed among Métis people. They also show that there is considerable inequity in the occurrence of injuries among the Métis compared with other Albertans. Health planners should design and implement strategies directed at the reduction of the burden of injury and associated complications for Métis people, especially in rural areas within the province of Alberta, as well as among Métis males. Since this study relied on data from one year, it could not determine injury trends. Additional research can examine the trend of injuries over time in Alberta, and whether the lack of significance for specific causes of injury, such as unintentional fall hospitalizations, is due to low power or whether the gaps between the Métis and other Albertans have started to close in some areas.

Compliance with ethical standards

Conflict of interest The authors declare they have no conflicts of interest.

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