Original article

Temporal changes in trauma according to alcohol sale restrictions during the South African national COVID-19 lockdown

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ABSTRACT

Introduction: The South African government enforced various alcohol sale restrictions during the COVID-19 lockdown in order to reduce hospital admissions related to alcohol-associated injuries. A cross-sectional study was performed to describe the temporal changes in trauma according to alcohol sale restrictions during the South African national COVID-19 lockdown.

Methods: Data from all trauma-related patients presenting to the emergency centre of Mitchells Plain Hospital from 01/03/2020 till 29/9/2020 and corresponding periods during 2019 were exported from an existing database. The relationship between variables was determined with the χ^2-test, Fisher's exact test, independent samples median test or *t*-test. A sub-analysis compared similar 2020 lockdown levels when a second alcohol ban were instituted while most business were allowed to operate (level 3b – alcohol banned versus level 3 – alcohol restricted).

Results: Total number of trauma presentations were 539 (14.6%) less in 2020 (n = 3160) than in 2019 (n = 3699); the mean number decreased by 2.5 per day (95% CI −2.9 to −2.1). Lockdown levels with an alcohol ban had on average 4.8 less patients per day than corresponding periods in 2019 (p < 0.001). No significant difference was observed in lockdown levels with alcohol sale restrictions (mean difference per day −0.4, p = 0.195). Trauma presentations increased significantly (mean difference per day 7.0 (95% CI 6.5 to 7.5)) from 2020 lockdown levels with alcohol sales ban (mean per day 11.4) to 2020 lockdown levels with alcohol sale restrictions (mean per day 18.4). Significantly less patients (mean −3.2 (95% CI −3.9 to −2.5)) presented during 2020 lockdown level 3b (alcohol sales banned, mean 13.9) compared to level 3 (alcohol sales restricted, mean 17.1).

Conclusion: Temporal changes in trauma were observed according to alcohol sale restrictions during South Africa's COVID-19 lockdown periods. Significantly less trauma cases presented during periods with an alcohol ban compared to periods where alcohol sales were only restricted.

African relevance

- The burden of alcohol-associated injuries in Africa is high.
- Alcohol sale bans may impact trauma in low to middle income areas with a potential decrease in total trauma cases and number of assaults.
- The restriction of selling alcohol on certain days and times seem to have a limited effect.

Introduction

Trauma is a global epidemic which results in substantial morbidity and mortality. Road traffic injuries, interpersonal violence and self-harm are the main injury-related causes [1]. Alcohol use is a leading risk factor of injuries [1], contributing to both intentional injuries (self-harm, interpersonal violence) and unintentional injuries (road traffic injuries, falls, drowning) [2]. Internationally, alcohol is estimated to be involved in about 15% of injuries presenting to the emergency centre [3];that percentage is much higher in South Africa, between 36% and 79% [4].

Alcohol-associated traffic injuries is globally a major problem [5–9], although the relationship between alcohol intoxication and transport-related mortality varies. One study reports that intoxicated road traffic crash victims were twice as likely to die than sober ones (4.6% versus 2.3%) [10], while another study indicated significantly better survival rates (adjusted odds ratio 0.41, 95% confidence interval (CI) 0.16-0.94) in crash victims with a high blood alcohol level [11]. Other studies found no increase in in-hospital mortality for intoxicated victims [8,12,13].

Alcohol also plays a substantial role in interpersonal violence, as aggression is associated with higher blood alcohol concentration levels [14]. Nearly 60% of homicide cases in South Africa were alcohol-related, while 78% of assault-injured youth (14–24 year) used alcohol and/or drugs prior to being assaulted [15]. Violence frequently occurs in the context of entertainment linked to alcohol consumption and thus typically peaks over weekends and festive days [9].

The causal role of alcohol in injuries is well established [16], and the reduction of the harmful use of alcohol is an important injury prevention strategy. One strategy is to regulate the availability of alcohol. Sweden prohibited alcohol sales on Saturdays during the early 1980's, resulting in a 14% reduction of outdoor assaults and 18% of indoor assaults. No effect on acute medical care or road traffic crashes were witnessed [17]. New liquor regulations in Sydney Australia also resulted in a significant reduction in the number of alcohol-related serious injuries and trauma presentations to the emergency centre (4.9% versus 3.7%, p < 0.05) [18]. The liquor regulations included the prohibition of takeaway alcohol sales after 10 pm, no servicing of alcoholic spirits ("shots") after 12 pm, and stopping all alcohol services at 3 am [18]. The prohibition of selling or possessing alcohol among Alaska Native communities, also resulted in a statistically significant fall in accident and homicide death rates of 74 and 66 per 100,000 respectively [19].

South Africa has the highest reported alcohol consumption in Africa, an estimated 9.3 l of pure alcohol per capita (6.3 for the WHO African region) [2]. The prevalence of heavy episodic drinking (consuming ≥60 g of pure alcohol on at least one occasion in the past 30 days) is 18.3% in the whole population and 59.0% in drinkers [2]. This pattern of consumption results in high-levels of alcohol-related violence and road traffic crashes as the risk of injury increases with the amount of alcohol consumed [16,20].

South Africa was among a handful of countries that introduced a temporary alcohol ban during the COVID-19 lockdown in order to reduce hospital admissions related to alcohol-associated injuries [21]. The first alcohol ban (under levels 5 and 4) was associated with a significant reduction in adult and trauma presentations [22–24], although one can argue that this reduction could have been confounded by the strict lockdown regulations confining most people to their homes. The South African government reinstated the suspension of alcohol sales for a second period (under level 3) when the number of severely ill COVID-19 patients rose sharply [25]. A 20% reduction in all trauma cases and a 40% reduction in all alcohol-related trauma were foreseen within three weeks of the ban [25]. The associated restriction of alcohol sales during certain levels of the South African lockdown presented the unique opportunity to investigate the association between alcohol availability and trauma presentations. Under level 3 lockdown, most businesses were allowed to operate, but due to an increasing trend in community transmission, a second alcohol ban was reintroduced. This created a natural experiment and the chance to study the association of alcohol sales and trauma presentations during the same level of lockdown but where most of the economy were active. The objective of the study was to describe the temporal changes in trauma according to alcohol sale restrictions during the South African national COVID-19 lockdown.

Methods

A prospectively collected observational database was analysed. The study was approved by the Health Research Ethics Committee of Stellenbosch University (Ref: N20/04/009_COVID-19) and included a waiver of informed consent.

Mitchells Plain Hospital is a 365-bed district-level hospital serving a population of approximately 600,000. It is situated on the outskirts of the Cape Town metropole and is situated in a low- to middle-income area that is known for drug abuse, crime, gangsterism, unemployment and poverty [26,27]. The emergency centre manages around 50,000 patients annually, with approximately 60% being of high acuity. Weekends in particular, are known for high rates of interpersonal violence [28].

The Hospital and Emergency Centre Tracking Information System (HECTIS) is an electronic patient tracking and registration database that is primarily used for administrative and management purposes. It is used to track patients through the emergency centre while collecting routine clinical data (e.g. process times, triage score, diagnosis and disposition). Data are stored off-site in an Oracle database that automatically performs daily back-ups. Only authorised access to HECTIS is allowed.

Convenience sampling was used to include all trauma-related patients that presented to the emergency centre of Mitchells Plain Hospital from 01 March 2020 till 29 September 2020, and corresponding periods during 2019. Patients were eligible for inclusion if an injury-related ICD-10 (International Statistical Classification of Diseases and Related Health Problems, 10th revision) code for the primary diagnosis (codes S00-T88) were assigned and the triage data indicated trauma. Patients with a diagnostic code relating to poisoning (codes T36-T50) or toxic effects of substances (codes T51-T65) were excluded. The study period included five different lockdown levels, with different regulations regarding the availability of alcohol (Table 1).

Data were exported from the HECTIS database for the various study periods. Variables included age, gender, date and time of arrival, mode of transport, patient acuity, diagnoses, and mechanism of injury. The South African Triage Scale (SATS) was used to determine patient acuity, and categorizes patients as non-urgent (green), urgent (yellow), very urgent (orange), and emergency (red) [29]. Patient acuity was determined at arrival to the hospital. Patient diagnoses and mechanism of

Table 1

Regulations regarding alcohol sales in different lockdown levels during the South African national COVID-10 lockdown (till 29 September 2020).

Lockdown level	Date	Regulations regarding alcohol sales
0 (No lockdown)	01/3/20–26/3/20	None
5	27/3/20–30/4/20	The sale, dispensing and distribution of liquor is prohibited.
4	01/5/20–31/5/20	The sale, dispensing and distribution of liquor is prohibited.
3	01/6/20–11/7/20	The sale of liquor by a licensed premises for off-site consumption, is permitted from 09 h00 to 17 h00, from Mondays to Thursdays, excluding Fridays, Saturdays, Sundays and public holidays.
3b	12/7/20–17/8/20	The sale, dispensing and distribution of liquor is prohibited.
2	18/8/20–20/9/20	The sale of liquor (a) by a licensed premises for off-site consumption, is permitted from 09 h00 to 17 h00, from Mondays to Thursdays, excluding Fridays, Saturdays, Sundays and public holidays; and (b) by a licensed premises for on-site consumption is permitted, subject to strict adherence to the curfew [every person is confined to his or her place of residence from 22H00 until 04H00 daily].
1	21/9/20–29/9/20	The sale of liquor (a) by a licensed premises for off-site consumption, is permitted from 09 h00 to 17 h00, from Mondays to Fridays, excluding weekends and public holidays; and (b) by a licensed premises for on-site consumption is permitted, subject to strict adherence to the curfew [Every person is confined to his or her place of residence from 00H01 until 04H00 daily]

injury were determined from completed ICD-10 codes (International Statistical Classification of Diseases and Related Health Problems, 10th revision). The periods of alcohol sales restriction were categorised as banned (lockdown levels 5, 4, 3b) or restricted (lockdown levels 3, 2, 1) (Table 1). Patients with missing data were not excluded; instead, the specific missing variable was indicated as unknown.

Summary statistics were used to describe all variables. Categorical data were summarised using frequency counts and percentages, and distributions of variables are presented as two-way tables or bar charts. Continuous variables (age) are presented as medians with quartiles. The relationship between categorical variables was determined with the χ^2 test or the Fisher's exact test, and continuous variables were compared with the independent samples median test or *t*-test. A sub-analysis was performed to compare level 3 (alcohol sales restricted) to level 3b (alcohol sales banned) to further evaluate the effect of an alcohol sale ban while other COVID-19 regulations stayed the same. Data were analysed using SPSS Statistics for Windows, Version 27.0 (IBM Corp. Released 2020. Armonk, NY: IBM Corp.).

Results

A total of 7033 injury-related patients were exported from HECTIS of which 174 (2.5%) were excluded (poisoning n = 136, toxic effects of substances n = 38); 6859 patients were analysed.

The total number of trauma presentations were 539 (14.6%) less in 2020 than in 2019 (3160 vs. 3699), while the mean number of patients decreased by 2.5 per day (95% CI −2.9 to −2.1) (Fig. 1). Lockdown levels where an alcohol ban were in place had on average 4.8 less patients than corresponding periods in 2019 (p < 0.001). No significant difference was observed in lockdown levels where alcohol sales were allowed but restricted (mean difference −0.4, p = 0.19). Significantly less patients (mean difference −3.2 (95% CI −3.9 to −2.5)) presented during 2020 lockdown level 3b where alcohol sales were completely banned (mean 13.9) compared to 2020 lockdown level 3 where alcohol sales were restricted (mean 17.1). Trauma presentations also increased significantly (mean difference 7.0 (95% CI 6.5 to 7.5)) from 2020 lockdown levels where alcohol sales were banned (mean 11.4) to 2020 lockdown levels where alcohol sales were only restricted (mean 18.4).

The median (25th – 75th percentile) age of participants was 27 (18–35) years for both 2020 and 2019. The proportion of children (81.4% versus 79.8%) and males (73.7% versus 74.6%) remained similar, while a difference occurred in where participants arrived from, day and time of arrival, and patient acuity (Table B.1).

The proportion of children increased significantly (p < 0.001) during 2020 when alcohol sales were banned (24.5%) compared to periods where alcohol sales were restricted (16.3%) (Table 2). A higher proportion of children were also seen during level 3b than in level 3 (21.3% versus 14.5%, p < 0.001) (Table B.1). The day of arrival changed overall in periods where alcohol sales were banned (p = 0.02), but not during the ban in level 3 (p = 0.31); the same trend was seen for weekday presentations. A higher proportion of trauma cases also presented during office hours in level 3b (23.8% versus 18.1%, p = 0.014). Patient acuity also changed significantly between level 3b and level 3 (Table B.2). The demographics and clinical characteristics of trauma presentations during periods where alcohol sales were banned and restricted in 2020 with corresponding periods during 2019 are presented in Table B.1.

Overall, 304 less accidents and 235 less assaults occurred during 2020 compared to 2019 (Table B.2). The mean difference between periods where alcohol sales were banned in 2020 compared to similar periods in 2019 were significantly less for accidents (−1.9 (95%CI −2.3 to −1.6) and assaults (−2.9 (95%CI −3.5 to −2.3)) (Table 3). Fewer trauma patients were also seen when alcohol sales were restricted for accidents (−1.2 (95%CI −1.6 to −0.8)), but not for assaults (1.0 (95%CI 0.3 to 1.6)) (Table 3). When only comparing 2020 periods, fewer accidents (−2.0 (95%CI −2.4 to −1.7)) and assaults (−4.8 (95%CI −5.4 to −4.3)) occurred during periods where alcohol sales were banned compared to periods of restricted sales (Table B.3); trauma with a sharp object was the type of assault with the biggest difference (−3.6 (95%CI −4.2 to −2.9)). There were no significant difference in the number of accidents that occurred between level 3 and level 3b (−0.2 (95%CI −0.7 to 2.3)), but assaults did occur significantly less (−3.1 (95%CI −3.8 to −2.3)); again the major difference was seen in trauma with a sharp object (−2.6 (95%CI −3.6 to −1.7)) (Table B.3). The absolute and mean numbers of accidents and assaults for each period per year is presented in Tables B.4 and B.5.

The nature of injury remained very similar between 2020 periods where alcohol sales were banned and restricted. There were 216 less open wounds (p < 0.001), but 17 more burns (p = 0.002) during the periods where alcohol were banned. Between level 3 and level 3b, open wounds decreased by 123 cases (p = 0.002) (Table B.6).

Multiple body regions (−115, p < 0.001), traumatic brain injuries (−87, p = 0.04) and injuries to extremities (−57, p = 0.002) were the body regions which decreased the most between 2020 periods with alcohol sales restricted and 2020 periods with alcohol sales banned (Table 4). Multiple body regions also decreased between level 3 and
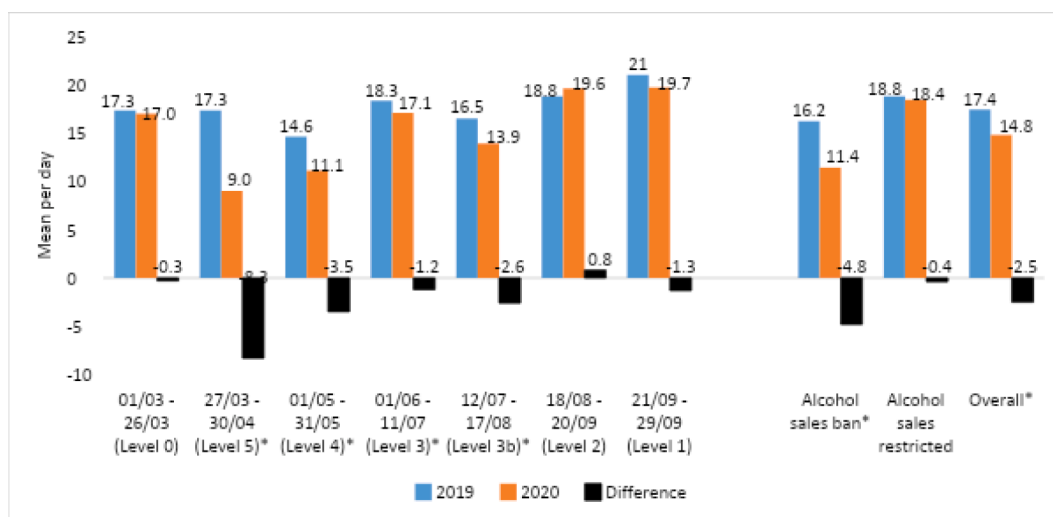
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Fig. 1. Mean trauma presentations per day for each lockdown level and corresponding dates in 2019 (* indicates statistically significant difference).

Table 2

Demographic and clinical characteristics of trauma patients during 2020 where alcohol sales were banned and restricted.

		Periods with alcohol sale restrictions n (%)	Periods with alcohol sales banned n (%)	p-value
Age (years)	Median (Q1–Q3)	27 (19–35)	26 (13–35)	0.09
Age category	Adult	1293 (83.7)	886 (75.5)	<0.001
	Child (<13 years)	252 (16.3)	288 (24.5)	
Gender	Male	1149 (74.4)	892 (76.0)	0.34
	Female	396 (25.6)	282 (24.0)	
Arrived from	Home/scene	1409 (91.2)	1018 (86.7)	0.001
	Other healthcare facility	102 (6.6)	128 (10.9)	
	General practitioner	33 (2.1)	26 (2.2)	
	Unknown	1 (0.1)	2 (0.2)	
Transport mode	Self	1122 (72.6)	823 (70.1)	0.29
	Ambulance	395 (25.6)	319 (27.2)	
	Fire or police services	10 (0.6)	12 (1.0)	
	Unknown	18 (1.2)	20 (1.7)	
Arrival day	Monday	194 (12.6)	179 (15.2)	0.02
	Tuesday	210 (13.6)	156 (13.3)	
	Wednesday	178 (11.5)	144 (12.3)	
	Thursday	164 (10.6)	134 (11.4)	
	Friday	179 (11.6)	165 (14.1)	
	Saturday	289 (18.7)	187 (15.9)	
	Sunday	331 (21.4)	209 (17.8)	
Weekday presentation	Weekday	800 (51.8)	670 (57.1)	0.006
	Weekend	745 (48.2)	504 (42.9)	
Arrival time	00 h00–07 h59	331 (21.4)	166 (14.1)	<0.001
	08 h00–15 h59	453 (29.3)	435 (37.1)	
	16 h00–23 h59	761 (49.3)	573 (48.8)	
After hours presentation	After hours	1258 (81.4)	872 (74.3)	<0.001
	Office hours	287 (18.6)	302 (25.7)	
Patient acuity[a]	Non-urgent (Green)	86 (5.6)	55 (4.7)	0.05
	Urgent (Yellow)	657 (42.5)	540 (46.0)	
	Very urgent (Orange)	711 (46.0)	492 (41.9)	
	Emergent (Red)	91 (5.9)	87 (7.4)	

Q1-Q3, 25th to 75th percentile.

[a] According to the South African Triage Scale.

level 3b (−60, p = 0.006) (Table B.7).

Discussion

Temporal changes in trauma were observed according to alcohol sale restrictions during South Africa's COVID-19 lockdown periods. Significantly less trauma cases presented during lockdown levels with an alcohol ban in place compared to periods where alcohol sales were only restricted. A higher proportion of trauma cases were children, and a shift towards more presentations during weekdays and office-hours was noticed. Less assaults occurred during periods where alcohol sales were banned, mainly due to a decrease in trauma from a sharp object. This also led to a significant decrease in open wounds.

Significantly less trauma-related cases presented during lockdown levels where alcohol sales were banned. A similar reduction also occurred in isolated Alaska Native villages, where an alcohol ban was associated with lower age-adjusted rates of serious injury from assault and motor vehicle crashes [30]. The large differences which occurred during South Africa's lockdown levels 5 and 4 are probably confounded by less vehicles on the road as the economy was mostly shut down; social interaction were also strongly discouraged. A more true reflection of the effect of banning alcohol sales is seen during level 3 where an 18.7% reduction occurred when the alcohol ban was reinstated. This is close to the estimated 20% reduction in trauma cases foreseen by the national government [25]. A subsequent 41% increase when the ban was subsequently lifted further illustrate the effect of the alcohol sales ban. Although the lifting of the alcohol ban coincided with a move to lockdown level 2 with fewer restrictions, trauma-related cases returned to levels seen during 2019 and even in the month before the lockdown was implemented.

Restricting alcohol sales to certain days and times seem to had a limited effect as the number of trauma-related presentations were similar to corresponding periods during 2019. Trauma numbers were also similar or even higher than the pre-lockdown period; a trend also noticed in assault cases. There is little research on the impact of restricted trading for off-site consumption. Studies in Germany and Switzerland indicated a reduction in hospitalisations for patients younger than 30 years when alcohol sales were prohibited during certain hours of the night [31,32]. On the other hand, when the restriction to sell alcohol on Saturdays was lifted in Sweden, an increase in alcohol consumption was noticed, but without a corresponding increase in assaults [33].

The proportion of injured children also increased during periods where alcohol sales were banned. This was rather unexpected as anecdotal evidence indicated that domestic violence cases and child neglect increased after the alcohol sales were allowed under lockdown level 3 [34]. The higher proportion could also relate to the imposed restrictions of the lockdown itself as schools were closed for long periods. Although the exact reason behind the finding is most likely multifactorial, it could just be a result of less adults presenting to the emergency centre during these periods.

A general trend of increasing trauma cases during office hours and weekdays occurred, particularly during periods where alcohol sales were banned. On-site consumption was only allowed under lockdown level 2, making it difficult to compare our results to other studies which mostly evaluated the effect of restricting on-site consumption [35]. Nonetheless, international data suggest that the restriction of trading hours tends to reduce alcohol-related injuries during the time of the restriction and shortly thereafter [35].

A significant decrease in assaults and specifically assault by a sharp object were seen during periods where alcohol sales were banned (Table 3). This is further evidence of the causal role of alcohol in violence-related injuries [16]. Although other environmental factors could also play a role, a consistent and significant dose-response relationship between the amount of alcohol consumed and the risk of injury has previously been established [16,20].

Blood alcohol concentrations in trauma patients were not done. This a major limitation of the study as the results could have been confounded by the restrictive social distancing measures associated with each lockdown level (except level 3). Furthermore, the data originated from a single district-level facility and although anecdotal evidence suggest a similar trend, generalisation to other settings should be done cautiously. We used the diagnostic codes (ICD-10) as assigned by emergency centre personnel. We did not attempt to determine the validity of the documented diagnosis made or whether the correct diagnostic code was assigned and acknowledge that an uncertain amount of bias could have been introduced. We also did not attempt to determine the severity of injuries or the broader impact on the healthcare system (e.g. length of stay). The major strength of the study is the use of a comprehensive database that is completed in real time by personnel familiar with it and who use it on a day-to-day basis.

Conclusion

Temporal changes in trauma were observed according to alcohol sale

Table 3

Mechanism of injury during periods where alcohol sales were banned and restricted in 2020 with corresponding periods during 2019.

	Periods where alcohol sales were banned						Periods where alcohol sales were restricted					
	Actual number			Mean per day			Actual number			Mean per day		
	2019	2020	p-value	2019	2020	Difference (95% CI[a])	2019	2020	p-value	2019	2020	Difference (95% CI[a])
Accidents												
All	783	583	0.01	7.6	5.7	−1.9 (−2.3 to −1.6)	750	647	0.270	8.9	7.7	−1.2 (−1.6 to −0.8)
Transport-related	328	180	0.01	3.2	1.7	−1.4 (−1.8 to −1.1)	290	224	0.024	4.4	3.9	−0.5 (−0.8 to −0.2)
Other external causes of accidental injury	455	403	0.30	3.5	2.7	−0.8 (−1.2 to −0.4)	460	423	0.751	5.5	5.0	−0.4 (−0.8 to −0.1)
Assault												
All	838	535	<0.001	8.1	5.2	−2.9 (−3.5 to −2.3)	756	843	<0.0001	9.0	10.0	1.0 (0.3 to 1.6)
Fire-arm	144	190	0.54	1.4	1.8	0.4 (0.1 to 0.8)	137	171	0.946	1.6	2.0	0.4 (0.0 to 0.8)
Sharp trauma	544	216	<0.001	5.3	2.1	−3.1 (−3.9 to −2.4)	486	478	<0.0001	5.8	5.7	−0.1 (−0.8 to 0.6)
Blunt trauma	147	112	0.001	1.4	1.1	−0.3 (−0.6 to 0.0)	129	169	0.009	1.5	2.0	0.5 (0.1 to 0.8)

[a] CI, Confidence interval.

Table 4

Nature of injury during 2020 where alcohol sales were banned and restricted.

	Periods with alcohol sale restrictions, n	Periods with alcohol sales banned, n	p-value
Nature of injury			
Fractures	212	180	0.24
Dislocation	26	17	0.63
Internal organ injury	76	67	0.37
Open wound	568	352	<0.001
Blood vessel	0	1	0.43
Contusion or superficial	228	198	0.13
Crushing	19	15	0.91
Burn	63	80	0.002
Effect of foreign bodies entering orifice	9	5	0.57
Other effects of external causes	2	3	0.66
Multiple injuries	1	0	1.00
Other specified injury	46	32	0.70
Unspecified injury	245	186	0.99
Body region			
Head and neck	373	276	0.70
Traumatic brain injury	227	140	0.04
Other head	90	92	0.04
Neck	44	27	0.38
Head and neck, other	12	17	0.09
Spine and upper back	2	2	1.00
Spinal cord	0	0	–
Vertebral column	2	2	1.00
Torso	305	225	0.71
Thorax	193	130	0.26
Abdomen	54	38	0.71
Pelvis and lower back	20	15	0.97
Abdomen, lower back & pelvis	22	23	0.28
Other trunk	16	19	0.18
Extremities	520	463	0.002
Upper extremity	251	230	0.02
Hip	6	2	0.48
Other lower extremity	263	231	0.08
Unclassifiable by body region	248	134	0.001
Multiple body regions	246	131	<0.001
System wide	2	3	0.66
Unspecified	43	35	0.76

restrictions during South Africa's COVID-19 lockdown periods. Periods where the selling of alcohol were completely banned had significantly less trauma cases than periods with alcohol sale restrictions. This trend remained significant during the alcohol ban under level 3 where most of the economy was active again. A significant decrease in assaults were associated with the alcohol ban and support the causal role of alcohol in violence-related injuries. The restriction of selling alcohol on certain days and times had a limited effect.

Dissemination of results

Results from this study were shared with staff members at the data collection site.

Authorship contribution statement

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: DJvH contributed 50%; CH 30%; CvK, and MdM contributed 10% each. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.afjem.2021.08.001.

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