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ORIGINAL ARTICLE

Linking criminal contexts to injury outcomes: findings and lessons from a national study of robbery in South Africa

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Abstract

Objectives South Africa has high rates of violence. The country has benefitted enormously from the use of injury surveillance data from the health sector, but there is a need to explore other avenues of routine data to advance violence prevention. We demonstrate the value of using routinely collected police data for enhancing our understanding of robbery as an important situational context for violence in South Africa.

Methods We analysed 1,841,253 cases reported to the police between 2003 and 2014 to describe the distribution and predictors of robbery violence in South Africa.

Results Robbery is prevalent in South Africa, but the use of violence beyond the threat of force is rare. After adjusting for confounding factors, the probability of co-occurring violence increases when robbery occurs at night, on weekends, involves cash and where the victims are black, young and female.

Conclusions Using routinely collected police data is valuable for investigating the situational dimensions of violence, thereby enhancing our understanding of contexts that shape violence and its injury outcomes. Such an approach can advance contextually sensitive violence prevention strategies.

Keywords Robbery violence · Public health · Criminal justice · South Africa · Data sharing

Introduction

The World Health Assembly's recognition of violence as a public health problem in 1996 invigorated evidence-based, population-level research aimed at its prevention (Krug et al. 2002). After two decades, the focus on intentional injury surveillance by this public health approach has yielded significant gains. Using homicide as its most robust measure, the public health approach has coincided with a 16% decrease in global homicide rates from 8.0 to 6.7 per 100,000 (WHO 2014). While this decrease is driven by a complex intersection of factors, good-quality surveillance data that are detailed, timely and reliable are critical for evaluating the effectiveness of interventions (Krug et al. 2002).

In South Africa, mortuaries have provided the most comprehensive data source to describe the country's epidemiology of violence. Mortuary-based injury surveillance systems covered most major cities from 2000. A sample of injury-related deaths presenting to mortuaries provided the first nationally representative profile for 2009 (Matzopoulos et al. 2015). While this descriptive epidemiology

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of violence has proved invaluable to its study and prevention, the focus on mortality is limiting because very little information on the context in which the intentional injury was sustained is available at the time of post-mortem. Attempts to establish non-fatal injury surveillance systems in sentinel sites have been unsuccessful and will require considerable time, resources and political will (Matzopoulos et al. 2010). In the interim, notwithstanding the value of research data, there is a need to consider other sources of routinely collected information if we are to advance our understandings of the contextual and situational features of fatal and non-fatal forms of violence at a national level (Bowman et al. 2014). Routinely collected police data provide one such potentially important source, because interdisciplinary research that consolidates public health prevention theory with criminal justice data provides an opportunity to improve our understanding of the situational contexts of violence (Shepherd and Sumner 2017). The aim of this paper is to demonstrate the utility of data drawn from the South African Police Services (SAPS) Crime Administration System (CAS), to describe the distribution and predictors of violence during robberies. Examining this epidemiology of robbery is crucial for enhancing our understanding of this crime as an important situational context for violence in the country.

Robbery is one of South Africa's most feared crimes (Statistics South Africa 2017b) because it is both pervasive and regularly associated with co-occurring violence (Altbeker 2008; CSVR 2008; Newham 2008; Statistics South Africa 2014, 2017a). However, there is, to date, no national analysis of the nature, forms and predictors of robbery violence, a significant oversight that we address in this article by situating robbery, a quintessential crime category, within the World Health Organization's (WHO) violence framework. By providing the first such epidemiology of robbery violence using crime data in South Africa, we demonstrate the value of criminal justice information systems for the study of violence in countries where non-fatal injury reporting systems remain underdeveloped.

Robbery as a form of violence

In South Africa, robbery 'consists of the theft of property by intentionally using violence or threats of violence to induce submission to its taking' (Milton 1996, p. 642). Although definitions differ across legal systems, robbery can be broadly characterized as involving the use or threat of force in a person-to-person interaction, which is instrumentally directed to obtain property. This is compatible with the WHO's definition of violence as 'the intentional use of physical force or power, threatened or actual, against oneself, another person or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation' (Krug et al. 2002, p. 1084). The inclusion of threatened force means that robbery is always an act of violence. The degree of force and method used to threaten the victim(s), the type of property stolen by the perpetrator(s) and the presence of a weapon are key factors in categorizing different types of robbery and are also critical moderators of the likelihood of 'injury, death, psychological harm, maldevelopment or deprivation'.

International research has clearly demonstrated that robberies may begin with the threatened use of force but can also escalate to include other more serious forms of criminal violence such as homicide, assault and sexual violence (Cook 1987; Indermaur 1995; Zimring and Zuehl 1986) and that incident level correlates such as sex of the victim, victim resistance, time of day, location and presence of a weapon and their interactions influence the probability of these violent outcomes during a robbery event (Lindegaard et al. 2015; Tillyer and Tillyer 2014; Yau et al. 2015). These studies have shown that studying the nature, forms, correlates and outcomes of robbery provides significant contextual data on violence, which is important for designing situationally sensitive violence prevention policies and interventions within a public health framework. As per the WHO's typology of violence (Krug et al. 2002), robbery is best described as a form of community violence (a type of interpersonal violence usually involving strangers or acquaintances). The aforementioned co-occurring crimes often associated with robbery align with the 'nature of violence' (Fig. 1). Thus, examining the conditions under which robbery escalates from the threat of the use of violence to physical acts of violence is critical to enhancing our understanding of the 'nature' of violence used in the perpetration of this common South African crime.

South African studies focusing on robbery violence (Newham 2008; Zinn 2008) go some way in describing its prevalence and risks. However, without better understanding the nature of and conditions under which robbery violence escalates, this profile is limited. Addressing these limitations by demonstrating how the crime of robbery is an important context for the types of violence that have been relatively well described by public health researchers is therefore important in broadening the scope of violence studies.

The benefits of harnessing the different but complementary strengths of the public health and criminal justice approaches to advance violence prevention are becoming increasingly apparent (Shepherd and Sumner 2017). In fact, some scholars have called for a theoretical fusing of their methods through innovative synthetic approaches such as epidemiological criminology (EpiCrim) (Akers and Lanier 2009). More concretely, the value of this convergence has been clearly demonstrated in the recently documented

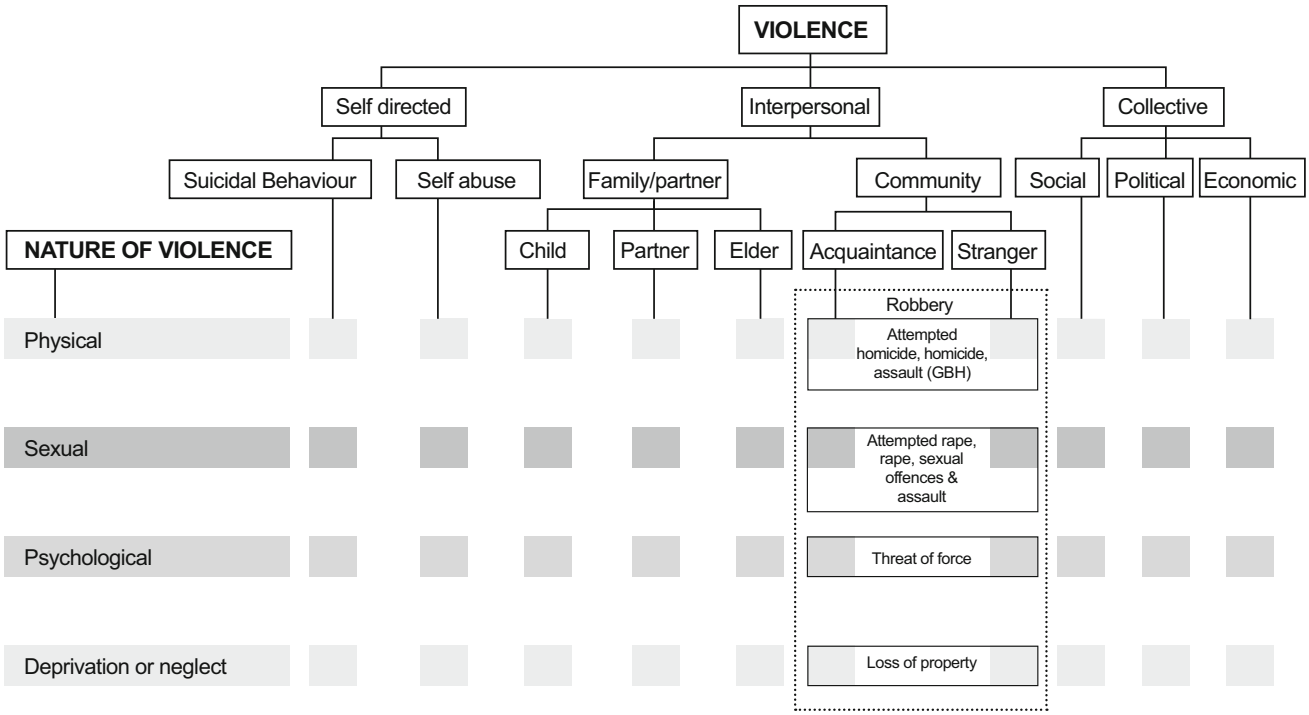

Fig. 1 Synergies between the WHO typology for violence and types of co-occurring violence during robberies in South Africa

'Cardiff' Model in which data on violence are shared between the health and criminal justice sectors (Boyle et al. 2013; Shepherd and Sumner 2017).

In an attempt to contribute to this growing pool of research, the current study uses routinely collected police data within a public health approach to violence to present the first epidemiology of robbery violence in South Africa. In so doing, we provide an example of the value of an interdisciplinary strategy that combines the strengths of both the criminal justice and public health approaches in advancing the epidemiology of violence for prevention in middle income countries.

Methods

Data and variables

Data were extracted from the CAS, which provides important contextual information on all crimes reported since 1994, but remains underutilized for research. It is updated every 24 h and is the first point of reporting and registration of crime. While other South African crime data sources are available, the national coverage and daily system refreshes of the CAS make it the most comprehensive source of recorded crimes in the country. Variables that did not threaten the integrity of ongoing criminal investigations were provided for all reported robberies between 2003 and 2014, these data constituted the most comprehensive and recently drawn dataset provided by the SAPS.

We included both common robberies, which involved the threat of force, and aggravated robberies in which actual force was used to obtain property. We excluded cash-in-transit heists, bank robberies and truck hijacking, due to the small number of cases; cases with missing or inconsistent information on victim demographics; and cases with multiple victims, to preserve the independence of observations in the sample. The remaining stand-alone categories included business robbery, carjacking, residential robbery and public robbery. Additional crimes taking place within the context of the robbery event included common assault, assault with grievous bodily harm (GBH), murder, attempted murder, rape, attempted rape, sexual offences and sexual assault.

For public robberies, we distinguished between the use of firearms and other weapons. Socio-demographic variables included age, gender and race[1] of victims. We did not analyse perpetrator-level information due to the high percentage of missing information (77%). Temporal variables included day of week, time of day, month and year of the

[1] Race is categorized here according to apartheid population group classifications, which include the terms black, coloured, Indian and white. While the authors recognise that such terms are social categories that served a socio-historical political purpose, they continue to be used in vital statistics and police reporting in South Africa. We have therefore retained the category and its associated terms for our analysis.

robbery. Situational data included the type of weapon and object(s) targeted during the robbery. We classified type of weapon as firearm(s), knives and body parts only or as 'other instruments' (including any instrument other than those recorded in the previous categories or the use of firearms, knives and body parts in combination with each other or other instruments). We also included an analysis of robbery by province. To explore the share of violence associated with robbery, our dichotomous outcome variable was whether there was co-occurring violence beyond the threat of force.

Analysis

The data were analysed at the incident level using R statistical computing environment (R Core Team 2014) and SAS 9.4 (SAS Institute Inc. Cary, North Carolina, USA). Descriptive statistics were used to assess the distribution of all variables. A multivariate binary logistic regression model was then fitted to predict type of robbery (no co-occurring violent crime vs. any co-occurring violent crime) using the pool of incident and victim characteristics as predictors. The Firth's logistic regression model was employed to reduce the small-sample bias in the maximum likelihood estimation of the logistic model (Firth 1993). All analyses were conducted at the 5% significance level.

Results

The final study sample included 1,841,253 single-victim incidents over a 12-year period from January 2003 to December 2014. Table 1 provides the descriptive data for the full set of robbery events. Public robbery was the most frequently reported type of robbery, accounting for 81.8% of cases, followed by residential robbery with firearm (8.7%). A high proportion of the cases (39.4%) were recorded in Gauteng, between 16h00 and midnight (48.8%) and approximately half the incidents were reported on weekends (50.5%). Robberies consisted primarily of cases with male victims (70.6%) and black victims (70.9%), and property was 'successfully' taken from the victim in the overwhelming majority (90.7%) of the cases. Firearms were most frequently (41.9%) used to effect the robberies.

Supplementary Table 1 (Online resource 1) indicates that there was an average of 153,437 robberies reported per year, with most incidents (190,449 incidents) recorded in 2003. There was a general decline in the number of incidents recorded between 2003 and 2011, followed by an increase from 2011. Only 3.9% of robberies recorded in our sample were accompanied by co-occurring violence. The proportion of co-occurring violence during robberies increased from 3.3 in 2003 to 4.5 by 2011 and began to decrease thereafter. However, the number of cases of co-occurring violence remained relatively stable over this period, suggesting some systematic shift in reporting and/or recording of these types of robberies as a proportion of all robberies.

The results of the multivariate logistic regression model employed to predict the probability of an incident involving co-occurring violence are presented in Table 2. Business robbery incidents were significantly more likely than public robberies to involve another violent crime [OR 4.388; 95% CI (4.217, 4.567)]. Cases of robbery reported in KwaZulu-Natal and the Northern Cape were more likely to involve another violent crime than were robbery cases reported in Gauteng. This is particularly interesting given that this latter province recorded the highest proportion of all robberies nationally, and is also the highest contributor to GDP in the country (Everatt 2017). More granular analysis is therefore required to identify the determinants of inter-provincial variation in robbery violence in South Africa (Bhorat et al. 2017).

The odds of co-occurring violence between and including the years 2003 and 2012 were significantly higher than those in 2014. The highest odds were observed in 2004 [OR 1.211; 95% CI (1.165, 1.258)]. Co-occurring violence was more likely to be reported in the fourth quarter (October to December). Robberies occurring during weekends were more likely to involve other violent crimes [OR 1.297; 95% CI (1.276, 1.318)]. Robberies were more likely to co-occur with other violent crimes between late night (20:00 and midnight) [OR 1.399; 95% CI (1.369, 1.430)] and early morning (midnight to 04:00) [OR 1.610; 95% CI (1.568, 1.652)].

The odds of reporting a robbery with co-occurring violence was significantly lower for victims 55 years and older than those aged between 35 and 54 years. The highest odds were found for those 17 years and younger [OR 1.462; 95% CI (1.404, 1.523)]. Females were significantly more likely to be victims of violent robberies [OR 1.287; 95% CI (1.265, 1.310)]. Black [OR 1.862; 95% CI (1.806, 1.919)], and 'coloured' [OR 1.591; 95% CI (1.527, 1.659)] and Indian [OR 1.383; 95% (1.317, 1.453)] victims were more likely than white victims to be involved in robberies co-occurring with other forms of violence. There was a significantly higher chance of co-occurring violence when 'other' instruments were used in a robbery as opposed to when it involved the use of a firearm only [OR 10.397; 95% CI (10.174, 10.626)]. Finally, robberies involving cash had the highest odds of co-occurring violence [OR 2.300; 95% CI (2.245, 2.356)].

Table 1 Robberies with and without co-occurring violent crime in South Africa, by selected variables, 2003–2014; (N = 1,841,253)

Robbery	All crimes (N = 1,841,253)	Any co-occurring crime?	
		No (N = 1,769,327, 96.1%)	Yes (N = 71,926, 3.9%)
Robbery type			
Business robbery	33,969 (1.8)	30,322 (1.7)	3647 (5.1)
Carjacking	141,280 (7.7)	139,228 (7.9)	2052 (2.9)
Public robbery	1,506,717 (81.8)	1,449,341 (81.9)	57,376 (79.8)
Residential robbery	159,287 (8.7)	150,436 (8.5)	8851 (12.3)
Province			
Eastern Cape	151,940 (8.3)	146,492 (8.3)	5448 (7.6)
Free State	80,907 (4.4)	77,418 (4.4)	3489 (4.9)
Gauteng	726,310 (39.4)	700,489 (39.6)	25,821 (35.9)
Limpopo	74,559 (4.0)	71,395 (4.0)	3164 (4.4)
Mpumalanga	103,315 (5.6)	97,963 (5.5)	5352 (7.4)
KwaZulu-Natal	329,606 (17.9)	314,782 (17.8)	14,824 (20.6)
North West	78,643 (4.3)	74,809 (4.2)	3834 (5.3)
Northern Cape	25,518 (1.4)	24,127 (1.4)	1391 (1.9)
Western Cape	270,455 (14.7)	261,852 (14.8)	8603 (12.0)
Year			
2003	190,449 (10.3)	184,155 (10.4)	6294 (8.8)
2004	178,137 (9.7)	172,048 (9.7)	6089 (8.5)
2005	161,347 (8.8)	155,592 (8.8)	5755 (8.0)
2006	163,945 (8.9)	158,064 (8.9)	5881 (8.2)
2007	148,381 (8.1)	142,384 (8.0)	5997 (8.3)
2008	140,628 (7.6)	134,306 (7.6)	6322 (8.8)
2009	142,975 (7.8)	136,956 (7.7)	6019 (8.4)
2010	139,225 (7.6)	133,098 (7.5)	6127 (8.5)
2011	133,428 (7.2)	127,399 (7.2)	6029 (8.4)
2012	137,526 (7.5)	131,538 (7.4)	5988 (8.3)
2013	146,072 (7.9)	140,402 (7.9)	5670 (7.9)
2014	159,140 (8.6)	153,385 (8.7)	5755 (8.0)
Quarter			
January–March	436,321 (23.7)	419,565 (23.7)	16,756 (23.3)
April–June	452,792 (24.6)	435,410 (24.6)	17,382 (24.2)
July–September	473,404 (25.7)	455,367 (25.7)	18,037 (25.1)
October–December	478,736 (26.0)	458,985 (25.9)	19,751 (27.5)
Weekend			
Weekday	911,327 (49.5)	883,164 (49.9)	28,163 (39.2)
Weekend (Friday–Sunday)	929,926 (50.5)	886,163 (50.1)	43,763 (60.8)
Time of day			
00h00–04h00	189,882 (10.3)	176,553 (10.0)	13,329 (18.5)
04h00–08h00	201,984 (11.0)	195,298 (11.0)	6686 (9.3)
08h00–12h00	243,202 (13.2)	237,245 (13.4)	5957 (8.3)
12h00–16h00	308,015 (16.7)	300,587 (17.0)	7428 (10.3)
16h00–20h00	461,947 (25.1)	445,891 (25.2)	16,056 (22.3)
20h00–00h00	436,223 (23.7)	413,753 (23.4)	22,470 (31.2)
Victim's age			
17 and under	80,025 (4.3)	76,865 (4.3)	3160 (4.4)
18–24	392,203 (21.3)	375,475 (21.2)	16,728 (23.3)
25–34	646,481 (35.1)	619,366 (35.0)	27,115 (37.7)

Table 1 (continued)

Robbery	All crimes (N = 1,841,253)	Any co-occurring crime?	
		No (N = 1,769,327, 96.1%)	Yes (N = 71,926, 3.9%)
35–54	591,151 (32.1)	570,380 (32.2)	20,771 (28.9)
55 and above	131,393 (7.1)	127,241 (7.2)	4152 (5.8)
Victim's sex			
Male	1,299,579 (70.6)	1,250,699 (70.7)	48,880 (68.0)
Female	541,674 (29.4)	518,628 (29.3)	23,046 (32.0)
Victim's race			
Black	1,305,895 (70.9)	1,248,653 (70.6)	57,242 (79.6)
Coloured	192,819 (10.5)	186,438 (10.5)	6381 (8.9)
Indian	94,126 (5.1)	91,274 (5.2)	2852 (4.0)
White	248,413 (13.5)	242,962 (13.7)	5451 (7.6)
Instrument			
Firearm	771,634 (41.9)	756,306 (42.7)	15,328 (21.3)
Personal weapon	587,847 (31.9)	570,478 (32.2)	17,369 (24.1)
Knife	311,703 (16.9)	302,284 (17.1)	9419 (13.1)
Other instruments	170,069 (9.2)	140,259 (7.9)	29,810 (41.4)
Property taken			
Cash	469,402 (25.5)	442,575 (25.0)	26,827 (37.3)
Cell phone	471,784 (25.6)	460,775 (26.0)	11,009 (15.3)
Clothing and jewellery	152,700 (8.3)	146,561 (8.3)	6139 (8.5)
Household items	558,609 (30.3)	539,246 (30.5)	19,363 (26.9)
Missing	188,758 (10.3)	180,170 (10.2)	8588 (11.9)

Discussion

Despite robbery being one of South Africa's most feared crimes (Statistics South Africa 2017b), our study confirms that co-occurring violence during a robbery event remains a relatively rare phenomenon in South Africa, which is consistent with Newham's (2008) analysis. Only 3.9% of all cases reported any form of co-occurring violence. Females are more likely to be victims of robberies accompanied by another form of violence once other confounding factors have been taken into account. This challenges international studies that show that the nature and likelihood of violence are an outcome of victim resistance (Felson et al. 2014; Lindegaard et al. 2015), which is more likely to be signalled by male victims (Zimring and Zuehl 1986). Women's higher likelihood of being victims of robbery violence in South Africa may be partly explained by the high rates of sexual violence linked to pervasive gender inequalities (Buiten and Naidoo 2016). Black, 'coloured' and Indian victims as well as victims in age groups 17 years and younger are most likely to be victims of co-occurring violence during a robbery. This resonates with research showing that black South Africans between the ages of 15 and 29 are most likely to be victims of fatal violence (Kramer and Ratele 2012).

Robbery violence is patterned by time. Co-occurring violence is more likely to be reported with robbery events in the fourth quarter (October–December), on weekends, as well as between late night (20:00 and midnight) and early morning (midnight to 04:00). These findings echo victim-focused studies (Cohn and Breetzke 2017) that link vacation seasons, weekends and evenings to periods of leisure during which people are less likely to be vigilant. The perpetrator-focused American study by Sorensen et al. (2015) presented similar findings, with most home invasion homicides in their study taking place at night. Night-time is also associated with high levels of alcohol consumption—a risk factor for intentional injuries more generally (Kleck and DeLone 1993). Importantly, although the number of cases of robbery with co-occurring violence remained relatively stable, they represented an increase in the *proportion* of overall robberies between 2003 and 2011. This proportional increase may be driving the perception that robberies are becoming more violent, when in fact, it could

Table 2 Results of logistic regression analysis predicting co-occurring violent crime during robberies in South Africa, 2003–2014; (N = 1,841,253)

Covariate	Level	Estimate	SE	OR	CI
Type of robbery	Business robbery	1.479	0.020	4.388	(4.217, 4.567)
	Carjacking	− 1.456	0.026	0.233	(0.221, 0.246)
	Residential robbery	0.071	0.014	1.074	(1.045, 1.104)
	Public robbery	–	–	–	–
Province	Eastern Cape	− 0.261	0.016	0.770	(0.747, 0.795)
	Free State	− 0.166	0.019	0.847	(0.816, 0.88)
	KwaZulu-Natal	0.150	0.011	1.162	(1.136, 1.188)
	Limpopo	− 0.394	0.020	0.674	(0.648, 0.702)
	Mpumalanga	0.079	0.016	1.083	(1.048, 1.118)
	North West	− 0.034	0.019	0.967	(0.932, 1.003)[ns]
	Northern Cape	0.118	0.030	1.126	(1.061, 1.194)
	Western Cape	− 0.073	0.015	0.930	(0.903, 0.958)
	Gauteng	–	–	–	–
Year	2003	0.075	0.020	1.077	(1.037, 1.119)
	2004	0.106	0.020	1.112	(1.070, 1.156)
	2005	0.146	0.020	1.157	(1.113, 1.203)
	2006	0.108	0.020	1.114	(1.072, 1.158)
	2007	0.141	0.020	1.152	(1.108, 1.197)
	2008	0.191	0.020	1.211	(1.165, 1.258)
	2009	0.117	0.020	1.124	(1.082, 1.168)
	2010	0.150	0.020	1.162	(1.118, 1.207)
	2011	0.153	0.020	1.165	(1.121, 1.211)
	2012	0.118	0.020	1.125	(1.082, 1.169)
	2013	0.038	0.020	1.039	(0.999, 1.08)[ns]
	2014	–	–	–	–
Quarter	April–June	− 0.026	0.011	0.974	(0.953, 0.995)
	January–March	− 0.025	0.011	0.976	(0.954, 0.997)
	July–September	− 0.051	0.011	0.950	(0.930, 0.971)
	October–December	–	–	–	–
Weekend	Weekend (Friday–Sunday)	0.260	0.008	1.297	(1.276, 1.318)
	Weekday	–	–	–	–
Time of the day	00h00–04h00	0.476	0.013	1.610	(1.568, 1.652)
	04h00–08h00	− 0.035	0.015	0.966	(0.937, 0.995)
	08h00–12h00	− 0.392	0.016	0.676	(0.655, 0.697)
	12h00–16h00	− 0.377	0.015	0.686	(0.666, 0.706)
	20h00–00h00	0.336	0.011	1.399	(1.369, 1.430)
	16h00–20h00	–	–	–	–
Victim's age	17 and under	0.380	0.021	1.462	(1.404, 1.523)
	18–24	0.251	0.011	1.285	(1.257, 1.314)
	25–34	0.163	0.010	1.177	(1.155, 1.200)
	55 and above	− 0.126	0.018	0.881	(0.850, 0.914)
	35–54	–	–	–	–
Victim's gender	Female	0.253	0.009	1.287	(1.265, 1.310)
	Male	–	–	–	–
Victim's race	Black	0.622	0.015	1.862	(1.806, 1.919)
	Coloured	0.465	0.021	1.591	(1.527, 1.659)
	Indian	0.324	0.025	1.383	(1.317, 1.453)
	White	–	–	–	–
Instrument	Knife	0.498	0.014	1.645	(1.599, 1.691)
	Other instruments	2.342	0.011	10.397	(10.174, 10.626)

Table 2 (continued)

Covariate	Level	Estimate	SE	OR	CI
	Personal weapon	0.498	0.012	1.646	(1.607, 1.686)
	Firearm	–	–	–	–
Property	Cash	0.833	0.012	2.300	(2.245, 2.356)
	Clothing and jewellery	0.483	0.017	1.621	(1.569, 1.676)
	Household items	0.262	0.013	1.299	(1.267, 1.332)
	Missing	1.460	0.017	4.306	(4.164, 4.453)
	Cell phone	–	–	–	–
	Intercept	− 5.450	0.027		
	Max-rescaled *R*-square	0.1639			
	AIC	520,363.64			
	− 2 Log L	520,269.66			

OR odds ratio, *CI* confidence interval. AIC with intercept only = 607,048.92; − 2 Log L with intercept only = 607,061.35; *ns* not significant; reference groups indicated with dashes

be an artefact of victims that were not injured increasingly selecting not to report the robbery event. This possibility warrants further exploration because it could be implicated in the consistently high levels of fear associated with robberies in South Africa.

Co-occurring violence during robberies is often a function of perpetrator–victim interaction (Statistics South Africa 2014). In our study, the use of a firearm to threaten the victim was associated with significantly lower odds of co-occurring violence. This echoes findings by South Africa's Victims of Crime Surveys (Statistics South Africa 2014, 2017a). Interactional patterns are also likely to be influenced by place of attack with robbery being more likely to involve a co-occurring violent crime at the victim's business and residence. These two settings are characterized by highly valued objects, and people in close proximity, which have both been implicated in moderating victim resistance—a strong risk factor for injury outcomes during robberies (Lindegaard et al. 2015). The decreased risk for violent outcomes when the perpetrator uses a firearm is also likely a function of less resistance by the victim during the robbery (Kleck and DeLone 1993). This may additionally explain the significantly high odds of co-occurring violence associated with the use of a combination of weapons (including firearms, body parts, sharp and blunt objects) that may be used in complex sequences to overcome victim resistance during robberies.

Limitations

Not all robberies are reported to the police, and there is likely a systematic bias in the reporting of robberies involving injuries and the loss of high-value items. In addition, the CAS was designed to be an administrative record-keeping resource for the criminal justice system. Its use as a data source for a national epidemiological study has highlighted a high proportion of missing perpetrator data and misclassified crimes as key quality challenges. Constrained by these, our analysis offers a profile of the socio-demographic characteristics of single-victim robberies only. The volume of data and exploratory nature of this study also necessitated grouping all forms of robbery-related violence into a single dichotomous outcome variable. Important potential differences between the various types of violence reported during robberies may have been lost in our analysis. However, ours is a critical first step in further contextualizing violence in South Africa. Future work will attempt to describe the epidemiology of violence in greater granularity by exploring the relationship between robbery and these specific types of violence.

Conclusion

Using the case of robbery violence, we have attempted to show the value of using data routinely collected by the criminal justice system in bringing greater situational context to the existing epidemiology of violence in South Africa. Research has shown that policing and violence prevention can be more effective if agencies work and formalize efforts to share data (Shepherd and Sumner 2017). Such sharing should be prioritized in South Africa and other country contexts where strong violence information systems are still in the early stages of development. In the absence of quality non-fatal intentional injury data surveillance systems, police data form important potential sources of information for the surveillance of violence. Stakeholders in both the criminal justice and health sectors should therefore invest in shared platforms that prioritize

the simplicity, flexibility, acceptability, sensitivity, positive predictive value and the quality, timeliness and usefulness of such routinely collected data (Klaucke et al. 1988). This investment will enable the analysis of quality police data through a public health lens, thereby providing important granular detail for advancing violence prevention.

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Compliance with ethical standards

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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