

RESEARCH AND PRACTICE

Employee and Customer Injury During Violent Crimes in Retail and Service Businesses

Corinne Peek-Asa, PhD, Carri Casteel, PhD, Jess F. Kraus, PhD, and Paul Whitten, MS

Workplace violence is a leading cause of occupational death, injury, worker's compensation costs, and lost productivity.¹⁻⁶ Robberies are the leading cause of occupational homicide and cause more than 60% of worker homicides each year.^{2,7} Small retail (convenience, grocery, and liquor stores) and service businesses (bars, restaurants, motels) have the highest risk of robbery and related workplace homicide and assault.^{1,2,7-9}

Violence prevention programs in retail and service businesses have focused on primary prevention of robberies or on the protection of employees during a robbery.¹⁰ Evaluations of these programs have shown some success in preventing robberies and in reducing homicides and assaults on employees.¹⁰ However, robberies are 1 of many potentially violent crimes that can occur in the business setting, and customers as well as employees are at risk of being victimized during these crimes. Customer victimization is especially important for retail and service businesses whose primary function is to serve customers.

Employers are required to protect employees from known hazards under the Occupational Safety and Health Administration (OSHA) General Duty Clause.¹¹⁻¹³ Some state OSHAs, such as in California, have more specific requirements for employers to identify and address violent hazards in the workplace to protect the employee.^{11,12,14} However, US Occupational Safety and Health mandates do not require employers or business owners to protect their customers. Thus far, no workplace violence programs have examined effects of violence on customers. Using a large database of crimes in small retail and service businesses, we examined the incidence and risk factors for customer and employee injury during workplace crimes.

METHODS

Study Population

Crimes were identified through review of Los Angeles Police Department reports of

Objectives. We sought to compare the frequency and risk factors for employees and customers injured during crimes in retail (convenience, grocery, and liquor stores) and service businesses (bars, restaurants, motels).

Methods. A total of 827 retail and service businesses in Los Angeles were randomly selected. Police crime reports (n = 2029) from violent crimes that occurred in these businesses from January 1996 through June 2001 were individually reviewed to determine whether a customer or an employee was injured and to collect study variables.

Results. A customer injury was 31% more likely (95% confidence interval [CI] = 1.11, 1.51) than an employee injury during a violent crime. Customer injury was more frequent than employee injury during violent crimes in bars, restaurants, convenience stores, and motels but less likely in grocery or liquor stores. Injury risk was increased for both employees and customers when resisting the perpetrator and when the perpetrator was suspected of using alcohol. Customers had an increased risk for injury during crimes that occurred outside (relative risk [RR] = 2.01; 95% CI = 1.57, 2.58) and at night (RR = 1.79; 95% CI = 1.40, 2.29).

Conclusions. Security programs should be designed to protect customers as well as employees. (*Am J Public Health.* 2006;96:1867-1872. doi:10.2105/AJPH.2005.071365)

crimes that occurred in 827 businesses from January 1996 through June 2001. Businesses were participants in the Workplace Violence Prevention Program (WVPP), conducted in Los Angeles, California. An evaluation of the WVPP has been published elsewhere.¹⁵ The WVPP was powered to examine changes in overall crime rates, not those with injuries, and, thus, we lack adequate power to examine intervention effects on employee and customer injury. Thus, for this analysis we controlled for intervention status but did not examine the intervention as an exposure variable.

Eligible business types included convenience stores, grocery stores, liquor stores, bars, restaurants, and motels. Businesses were identified through a commercial directory that included self-identified business type classified by a single standard industrial classification code that indicated the primary nature of the business. Businesses were randomly sampled using a stratified design to represent business types and neighborhood crime rates within the city. The WVPP included 314 intervention, 96 control, and 417 businesses that declined intervention participation.

Data Collection

Businesses were matched by address to an electronic crime report database maintained by the Los Angeles Police Department. The electronic database did not include sufficient details of each crime to identify the role of employees and customers. Thus, each crime report was retrieved and read thoroughly. A total of 2954 reports were matched by address to the 827 business addresses between January 1996 and June 2001. Of these, 925 (31.3%) were excluded because they were duplicate reports or described crimes that did not have any relation to the business. For example, an assault on an individual walking by a business might be reported at that business's address but would not be related to the business. The final sample included 2029 reports of violent crimes.

Violent crimes included homicide, assault, battery, robbery, rape, and attempts to commit these crimes. Victims were considered customers of the business if a business transaction occurred or the victim was a nonemployee located within the business or walking in or out of the business. Employees and customers were considered injured if the report

mentioned physical injury of any severity level to the individual, whether or not medical treatment was sought.

Study Variables

The 2 outcome variables examined were the occurrence of an employee injury and the occurrence of a customer injury during a crime. The crime reports did not include full information about all people present in the business during the crime, so the denominator for risk estimates was the crime. The independent variables were chosen on the basis of reported measurable risk in previous literature and availability on the police crash report. Independent variables included resisting the perpetrator, presence of multiple perpetrators, crime occurrence between 10 PM and 6 AM, location of the crime outside of the business, suspicion of alcohol use by the perpetrator, presence of multiple people during the crime, if the crime occurred during the course of an argument, and if the crime was premeditated. Resistance to the perpetrator included noncooperation, or arguing with, chasing, or being physically aggressive with the perpetrator(s).

Location was coded as inside or outside the business building(s) based on where the crime was initiated. Outdoor business locations were confined to business property. Suspected alcohol use was documented in the police report if the victim(s) stated to police that the perpetrator was intoxicated or if the responding officer observed the perpetrator to be intoxicated. Multiple people present during the crime included both employees and customers. Crimes were considered to have occurred in the course of an argument if the police report specifically mentioned arguing initiated by the victim or perpetrator. Crimes were considered premeditated if the perpetrator exhibited suspicious behavior before the violent crime (e.g., carried a weapon, stalked the business).

Analysis

We used SUDAAN software¹⁶ to calculate risk ratios and their standard errors to take into account the correlated nature of the data. Three clustering factors were included: individual business (because multiple crimes could have occurred in a single business), business type, and intervention status. Intervention

status included whether the business was an intervention, control, or decline business and whether the crime occurred before or after study interaction, thus control for all intervention strata. Standard errors were calculated using Taylor linearization.

The unit of analysis was the crime event. Analyses were conducted separately for overall crimes and for robberies. Robberies were examined separately, because they have been the primary focus of previous workplace violence research in the retail industry. Robberies are a subset of all crimes and included any police report in which one of the crime motivations was listed as robbery. Risk ratios comparing employee and customer injury were calculated overall and by type of business. Analyses stratified on type of business were clustered only on individual business and intervention status. Risk ratios for employee and customer injury were calculated

for independent variables using hierarchical logistic regression. Resulting estimates were interpreted as risk ratios, because assumptions for risk ratio approximation were met. Each ratio was controlled for the 3 clustering factors and mutually adjusted for all dependent variables.

RESULTS

Incidence of Employee and Customer Injury

Employees were injured in 542 (26.7%) crimes, and customers were injured in 712 (35.1%) crimes (Table 1). A customer injury was 31% more likely than an employee injury (95% confidence interval [CI]=1.11, 1.51). Injury to both employees and customers occurred in only 14 (0.7%) crimes. Multiple employees were injured in 2.4% of all events leading to employee injury, and

TABLE 1—Risk of Employee and Customer Injury During Violent Crimes in Retail and Service Businesses: Los Angeles, California, January 1996–June 2001

	Total Crimes, No. (%)	Events Leading to Employee Injury, No.(%)	Events Leading to Customer Injury, No.(%)	Risk Ratio of Customer to Employee Injury ^a (95% CI)
All Violent Crimes^b				
Type of business				
Convenience store	394 (19.4)	94 (23.9)	105 (26.7)	1.12 (0.83, 1.41)
Bar	98 (4.8)	19 (19.4)	69 (70.4)	3.63 (1.87, 5.39)
Grocery store	325 (16.1)	123 (37.9)	63 (19.4)	0.51 (0.33, 0.69)
Liquor store	483 (23.8)	154 (31.9)	127 (26.3)	0.82 (0.58, 1.06)
Motel	395 (19.5)	65 (16.5)	232 (58.7)	3.57 (2.45, 4.69)
Restaurant	334 (16.5)	90 (27.0)	116 (34.7)	1.29 (0.92, 1.86)
Total	2029	542 (26.7)	712 (35.1)	1.31 (1.11, 1.51)
Robberies				
Type of business				
Convenience store	231 (22.6)	35 (15.3)	29 (12.4)	0.89 (0.44, 1.34)
Bar	14 (1.4)	6 (42.9)	4 (28.6)	... ^c
Grocery store	196 (19.2)	58 (29.7)	14 (7.2)	0.24 (0.10, 0.38)
Liquor store	275 (26.9)	74 (26.9)	40 (14.6)	0.54 (0.30, 0.78)
Motel	152 (14.9)	16 (10.5)	69 (45.4)	4.31 (1.51, 7.11)
Restaurant	154 (15.1)	28 (18.2)	13 (8.4)	0.46 (0.17, 0.75)
Total	1022	217 (21.2)	171 (16.7)	0.79 (0.59, 0.99)

Note. CI = confidence interval.

^aRisk ratios for the totals were clustered on intervention status, business type, and individual business. Risk ratios stratified by business type were clustered on intervention status and individual business.

^bViolent crimes included homicide, assault, battery, robbery, and attempts to commit these crimes.

^cNumber of robberies were too few to calculate reliable risk ratio estimates.

multiple customers were injured in 3.4% of events leading to customer injury.

Customers had the highest proportion of injuries in bars (70.4%), motels (58.7%), and restaurants (34.7%). Employees had the highest proportion of injuries during violent crimes in grocery stores (37.9%), liquor stores (31.9%), and restaurants (27.0%).

Customer injury was more than 3.5 times likely than an employee injury during crimes in bars (95% CI=1.87, 5.39) and motels (95% CI=2.45, 4.69) and nearly 30% more likely in restaurants (95% CI=0.92, 1.86). Customers were less likely than employees to be injured in grocery stores (relative risk [RR]=0.51; 95% CI=0.33, 0.69) and liquor stores (RR=0.82; 95% CI=0.58, 1.06).

Because robberies have been the primary focus of workplace violence prevention programs, we examined trends among robberies separately (Table 1). A customer injury was 21% (95% CI=0.59, 0.99) less likely than an employee injury during robberies. Motels were the only business type in which a customer injury was more likely than an employee injury in both overall violent crimes and robberies. Although customer injury was more likely during violent crimes in restaurants, customer injury was 46% less likely than employee injury in restaurant robberies (95% CI=0.17, 0.75). Although robberies were infrequent in bars, bar robberies were associated with a high proportion of injuries for both employees (42.9%) and customers (28.6%).

Risk Factors Associated With Employee and Customer Injury

Resisting the perpetrator of the crime was consistently related to increased risk for injury for both employees and customers, and the risk was higher for robberies than for all violent crimes combined (Table 2, Table 3). Crimes occurring from 10 PM to 6 AM were protective against employee injury. Customers, however, had 1.79 (95% CI=1.40, 2.29) times the risk of injury for violent crimes that occurred late at night. Customers were at increased risk for injury when the crime occurred outside the business building, compared with employees, who were at decreased risk. The risk was particularly high for customers who were

TABLE 2—Risk Factors for Employee and Customer Injury During 2029 Violent Crimes Occurring in 827 Small Retail and Service Businesses: Los Angeles, California, January 1996–June 2001

	No. ^a	Crimes With Employee Injuries		Crimes With Customer Injuries	
		Employee Injured	Risk Ratio ^b (95% CI)	Customer Injured	Risk Ratio ^b (95% CI)
Anyone resisted					
Yes	1086	348	1.64 (1.32, 2.03)	433	1.54 (1.24, 1.92)
No	873	192	1.00	257	1.00
Employee resisted					
Yes	574	347	1.77 (1.55, 2.02)	NA	NA
No	565	193	1.00	NA	NA
Customer resisted					
Yes	531	NA	NA	441	1.19 (1.10, 1.29)
No	370	NA	NA	258	1.00
Crime occurred between 10 PM and 6 AM					
Yes	706	154	0.69 (0.54, 0.89)	318	1.79 (1.40, 2.29)
No	1323	391	1.00	394	1.00
Crime occurred outside ^c					
Yes	710	174	0.90 (0.71, 1.14)	335	2.01 (1.57, 2.58)
No	1297	361	1.00	368	1.00
At least 1 perpetrator was suspected of using alcohol					
Yes	156	58	1.70 (1.19, 2.43)	68	1.07 (0.66, 1.43)
No	1797	476	1.00	606	1.00
Multiple suspected perpetrators					
Yes	741	188	0.92 (0.72, 1.18)	213	0.71 (0.65, 0.90)
No	1240	351	1.00	472	1.00
Multiple people present					
Yes	524	159	1.26 (0.98, 1.62)	129	0.55 (0.42, 0.71)
No	1505	386	1.00	583	1.00
Occurred in course of argument					
Yes	450	136	1.27 (0.96, 1.68)	250	2.49 (1.93, 3.21)
No	1579	409	1.00	462	1.00
Crime was premeditated					
Yes	563	171	1.37 (1.08, 1.74)	136	0.61 (0.48, 0.78)
No	1466	374	1.00	576	1.00

Note. CI = confidence interval; NA = not applicable.

^aCases with unknown values included resisting = 70, location of crime outside = 22, suspected perpetrator alcohol use = 76, multiple suspected perpetrators = 48.

^bRisk ratios and confidence intervals were clustered by intervention status, business type, and individual business and mutually adjusted for each risk factor.

^cCrime occurred outside of the business building but on business property, such as a parking lot.

robbed outside of the business building, which led to a 5-time increase in injury risk (95% CI=3.40, 7.84). Suspicion of alcohol use by the perpetrator was associated with increased risk for injury in all models but was only significant for employee injury during all violent crimes (RR=1.70; 95% CI=1.19, 2.43).

Violent crimes with multiple suspected perpetrators were not related to employee injury and led to less frequent customer injury. However, robberies with multiple suspected perpetrators led to increased injury for both employees (RR=1.36; 95% CI=0.96, 1.93) and customers (RR=1.87; 95% CI=1.25, 2.80). In comparison, overall crimes and

TABLE 3—Risk Factors for Employee and Customer Injury During 1022 Robberies Occurring in 827 Small Retail and Service Businesses: Los Angeles, California, January 1996–June 2001

	Crimes With Employee Injuries			Crimes With Customer Injuries	
	No. ^a	Employee Injured	Risk Ratio ^b (95% CI)	Customer Injured	Risk Ratio ^b (95% CI)
Anyone resisted					
Yes	449	133	2.52 (1.81, 3.52)	101	1.98 (1.25, 3.12)
No	554	82	1.00	70	1.00
Employee resisted					
Yes	305	132	2.26 (1.79, 2.87)	NA	NA
No	434	83	1.00	NA	NA
Customer resisted					
Yes	171	NA	NA	100	1.62 (1.29, 2.04)
No	154	NA	NA	51	1.00
Crime occurred between 10 PM and 6 AM					
Yes	315	62	0.94 (0.64, 1.36)	70	1.26 (0.86, 1.84)
No	707	155	1.00	101	1.00
Crime occurred outside ^c					
Yes	267	46	0.67 (0.45, 1.00)	101	5.16 (3.40, 7.84)
No	753	171	1.00	70	1.00
At least 1 perpetrator was suspected of using alcohol					
Yes	25	6	1.30 (0.46, 3.67)	8	2.23 (0.63, 7.90)
No	967	206	1.00	156	1.00
Multiple suspected perpetrators					
Yes	549	130	1.36 (0.96, 1.93)	101	1.87 (1.25, 2.80)
No	461	86	1.00	65	1.00
Multiple people present					
Yes	353	97	1.66 (1.17, 2.37)	36	0.38 (0.23, 0.61)
No	669	120	1.00	135	1.00
Occurred in course of argument					
Yes	42	13	2.04 (0.98, 4.25)	17	2.58 (1.28, 5.21)
No	980	204	1.00	154	1.00
Crime was premeditated					
Yes	372	104	1.92 (1.37, 2.67)	35	0.37 (0.24, 0.56)
No	650	113	1.00	136	1.00

Note. CI = confidence interval; NA = not applicable.

^aCases with unknown values included resisting = 19, location of crime outside = 2, suspected perpetrator alcohol use = 30, multiple suspected perpetrators = 12.

^bRisk ratios and confidence intervals were clustered by intervention status, business type, and individual business and mutually adjusted for each risk factor.

^cCrime occurred outside of the business building but on business property, such as a parking lot.

some of the injuries in restaurants could be associated with bars located within the restaurant. Aggression in bars has been correlated with crowding, noise, inadequate seating, excessive heat, and being unclean, which are thought to irritate and provoke bar patrons, especially when intoxicated.^{17–20} The behavior of bartenders and bouncers may contribute to violence in bars,¹⁹ which is consistent with our finding that customers are at increased risk for injury when the perpetrator is an employee of the business. Strategies for reducing violence in bars include environmental controls, changes in bar management practices, legal liability of bartenders, improved violence prevention training, and improved relationships with police.^{19,21–23}

Previous literature has focused on risk factors for employee injury during violent workplace crime. Resisting the perpetrator of the crime has been shown to increase the risk for employee injury,²⁴ and we show similar risk for both employees and customers. We found that the presence of multiple people during the crime increased the risk for employee injury but decreased risk for customer injury. Although some previous research has found that robbery and injury were more likely with only 1 employee on duty,^{25–28} other studies have found that the number of employees was not a risk factor.^{29,30} Two studies examined the risk for robbery depending on the presence of customers; 1 found that the absence of customers increased robbery risk,²⁵ and 1 found that the absence of customers was not a risk factor.²⁹ We found that employee injury, but not customer injury, was less likely during late-night hours, which is inconsistent with previous literature.^{25,31}

Risk factors for customer injury were different than risk factors for employees. Customers were more likely to be injured in service businesses (bars, restaurants, motels), whereas employees were more likely to be injured in retail businesses (convenience, grocery, and liquor stores). Customers were more likely to be injured during crimes that occurred late at night, outside of the business building, with no other people present, and during arguments.

These differences have important implications for prevention strategies, and commonly

robberies with multiple people present increased employee injury. Customers, however, were less likely to be injured when multiple people were present. Customers and employees were at increased risk for injury when the crime or robbery occurred during the course of an argument. Employees, but not customers, were at increased risk for injury when the crime or robbery was premeditated.

DISCUSSION

In small retail and service businesses, violent crimes led to a customer injury 31% more often than to an employee injury, and customer injury was only slightly less likely than employee injury during robberies.

Bars were associated with the highest proportion of injuries for customers. In addition,

recommended elements of security plans can be applicable to customer safety.^{10,32,33} Improved lighting and visibility, both within the business and outside area around the business building, have been shown to be effective in reducing robberies.^{26,27,29,32} Although businesses such as bars and restaurants may build an ambiance through low lighting, these businesses could increase lighting and visibility on the outside of the business, where we show customers to be at high risk for injury.

Training employees to handle robbers, intoxicated individuals, and potentially aggressive customers also has been shown to be effective in reducing workplace violence and related injury.^{19,20,24} Such training rarely includes instruction on how to help customers handle these situations. Training employees to handle a wide variety of violent threats might be especially relevant in bars, restaurants, and motels, where it is likely that employees such as security guards will intervene during altercations in which customers are involved.

Some strategies to protect employees could have potential negative effects on customers. Protective barriers that isolate employees will protect the employee but leave customers vulnerable. Cash control policies have been very effective in reducing robberies but could make customers vulnerable targets for robbery when cash from the business is limited. Further research is needed to understand how different prevention and intervention strategies differentially affect employees and customers.

Our study had several limitations. Many, perhaps the majority, of crimes in small businesses are not reported to police, and our estimates of injury reflect only reported crimes. Because crimes leading to injury are more likely to be reported, the incidence of injury may be an overestimate. Crime reports used in this analysis were linked by address to a participating business. Although crime reports without a full address (e.g., a crime report that included only an intersection of 2 streets) would be unlikely to involve the business, some crimes meeting eligibility criteria could have failed the linking process. Although police reports documented the occurrence of injury, those reports did not include information about injury severity.

Risk calculations for customer injury were not conditioned on the presence of a customer in the business, because this information was not consistently documented in police reports. The risk of customer injury is thus conservative, because some of the crimes may have occurred while no customers were on the premises of the business and, therefore, none were at risk.

Small retail and service businesses are common locations for violent crime, and these crimes pose risks for both employees and customers. Most businesses have taken some steps to reduce crime,^{15,34} but safety requirements have focused on employees. Motivation for employers to protect their employees and their customers comes from different sources. Crime prevention programs have historically been required for employee protection through city ordinances or OSHA requirements.^{10,12,13} Failing to protect customers will not violate current ordinances or OSHA standards, but employers can face legal liability and financial consequences for violent injuries occurring in their businesses.¹¹ Wider public knowledge of risks to customers may introduce new mechanisms to promote workplace safety programs. ■

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Contributors

C. Peek-Asa wrote the article and supervised data collection and analyses. C. Casteel assisted in designing and conducting the analysis and contributed to writing some sections. P. Whitten conducted the analysis. J.F. Kraus was principal investigator for the study and reviewed the article.

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Human Participant Protection

This study was reviewed and approved by the University of California, Los Angeles, human subject protection committee and was approved, through a memorandum of understanding, by the Los Angeles Police Department.

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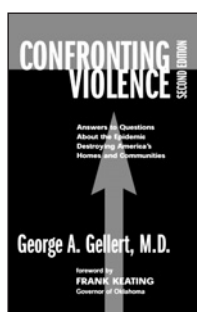
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This book discusses interpersonal violence, including child and elder abuse, sexual assault, murder, suicide, stranger violence, and youth violence. It is written in a series of easy-to-reference questions and answers, and provides tips for avoiding high-risk situations. *Confronting Violence* includes lists of organizations and public agencies that provide help.

The 2nd Edition includes a new preface by APHA Executive Director Mohammad N. Akhter, MD, MPH, as well as new statistics and new references to recent events, such as the Columbine High School massacre and the child sex abuse scandal in the Catholic Church.

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