Employee Resistance and Injury During Commercial Robberies

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Objectives: To examine the association between employee resistance and injury and examine whether type or location of property stolen was associated with employee resistance during commercial robberies in a large metropolitan city. **Methods:** Robbery data were abstracted from police crime reports between 2008 and 2012. Log binomial regression models were used to identify predictors of employee resistance and to evaluate the association between employee resistance and injury. **Results:** Employees resisted a robber in nearly half of all robbery events. Active employee resistance was significantly associated with employee injury (Adj PR: 1.49, 95% confidence interval, 1.34 to 1.65). Goods being stolen were associated with active employee resistance and employee injury, whereas cash only being stolen was inversely associated with employee injury. **Conclusions:** Results suggest that employee training in nonresistance can be an important strategy in protecting employees working with the exchange of cash and goods.

Although the US Occupational Safety and Health Act requires that workplaces provide a safe environment for employees, this is not always the case.[1] In 2009, more than 137,000 employees sustained nonfatal injuries as a result of workplace violence.[2] Despite a decline in the number of workplace fatalities over the past decade,[3] nearly 700 deaths occur each year as a result of workplace violence.[2] Most workplace fatalities occur during robberies by unknown perpetrators.[3–5] In 2012, 158 employees were killed during robberies in the United States.[6] Given that the majority of workplace homicides occur during robberies, it is important to identify factors which may place employees at greater risk of being a target.

Occupations with the highest rate of robberies include retail and service industries,[4] specifically convenience and liquor stores.[4,7,8] Furthermore, most robberies occur at night and when few customers are present.[9–11] Occupations that entail direct cash transfer or deal with large amounts of cash are at greater risk of being a target.[11–13] Although the greatest number of workplace homicides occur during robberies, the majority of robberies do not result in employee injury.[9]

Certain factors have been found to impact whether an employee gets injured during a robbery.[14,15] Employees of convenience stores were less likely to be injured when no cash was stolen or when only merchandise was stolen and when the perpetrator did not use a weapon.[10,16] Conflicting results have been found regarding the influence of customers and time of robbery on employee injury.[16,17] One study, limited to convenience store robberies, found that employees had a lower risk of injury when customers were present.[10] Nevertheless, another study looking at robberies in retail and service industries found that the presence of customers increased the risk of employee injury.[17] These conflicting results may be related to employee resistance during the event, which has been found to increase the risk of injury or death for both employees and customers.[16–18]

Despite knowledge that employee resistance leads to increased risk of both employee and customer injury, few studies have examined employee resistance and characteristics that influence employee resistance during a robbery. Factors such as weapon use by the perpetrator, time the robbery occurred, employee safety training, the number of employees on staff, and whether property was stolen were found to be associated with employee resistance.[16] Nevertheless, past studies have been limited to convenience store robberies, were limited in sample size, and failed to examine whether location of property stolen influenced employee resistance. Furthermore, few studies have examined the influence of type of employee resistance, active versus passive, and employee injury. We hypothesized that employee resistance was associated with the type of property stolen, and that employee injury was more likely when property was taken. Also, we believed that type of employee resistance, active resistance or passive resistance, would impact these associations. Therefore, this study sought to examine the association between types of employee resistance and injury during commercial robberies occurring in a large metropolitan city between 2008 and 2012. In addition, this study examined whether type or location of property stolen influenced employee resistance during a robbery.

METHODS

Commercial robbery data were abstracted from crime reports collected between January 1, 2008, and December 31, 2012, from a large metropolitan police department. Police reports were obtained for all commercial robberies that occurred during the study period. Robbery events were defined as instances in which a perpetrator stole or attempted to steal cash or items from a commercial property. A total of 3839 robberies were reported by the police department during the study period. Up to 64 (1.7%) observations were removed from the analyses because of missing employee resistance or employee injury data; therefore, the total number of events included in the analysis was 3775.

Primary Outcome and Exposure

The primary outcome was employee injury. Employee injury was recorded if any form of physical contact was made between the robber and the employee. Employee injury was coded as a dichotomous variable (yes/no). Employee resistance of the perpetrator during the robbery event was the primary exposure. Employee resistance was stratified by type of resistance noted on the police report—active, passive, or no employee resistance. Active resistance was defined as instances when the employee directly confronted the perpetrator during the robbery. Examples of active employee resistance include pulling a weapon, refusing to hand over the money or property, or arguing with the perpetrator. Other forms of employee resistance such as triggering an alarm, unable to open the safe or register, running from the perpetrator, or calling the police were classified as passive resistance. These definitions of active and passive resistance were based off of a previous study conducted by Faulkner et al.[16]

Covariates

To examine the influence of property stolen on employee resistance and injury, we included a number of covariates related to type of property stolen. If cash was reported as stolen, the

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location from which cash was stolen was categorized into the following groups: cash stolen from the register, cash stolen from a safe or hidden place, or cash stolen from the employee. Because robberies could result in cash being stolen from multiple locations, these categories were not mutually exclusive. Finally, robberies could result in both cash and goods being stolen. To observe whether type of property stolen impacted employee resistance or injury, two mutually exclusive variables were created—cash only stolen and goods only stolen. Examples of goods that were commonly reported as stolen were surveillance tapes, medications, personal items from employees, automobiles, and computers. The financial loss from the robbery was estimated using the dollar value of property stolen during the event.

Business type was grouped into the following categories: gas/convenience stores, liquor/grocery/pharmacies, restaurants/bars, bank/credit unions, other retail, and other. Other types of businesses included the following: barber/beauty shops, hotel/motels, casinos, office space, post office, adult business, self-storage, and rental centers. Time of the day the robbery occurred was categorized as events occurring during the day (6:00 AM to 5:59 PM) and those occurring at night (6:00 PM to 5:59 AM). Presence of customers in the business at the time of the event and whether the perpetrator used any type of weapon were coded as dichotomous variables. The most frequently used weapons by the perpetrator included guns and knives.

Statistical Analysis

Chi-square tests were used to identify differences in robberies that resulted in employee injury and those that did not result in injury. Next, to examine whether type of employee resistance was associated with property stolen, chi-square tests were used to identify differences in employee resistance by type and location of property stolen. Finally, log binomial regression models were used to identify predictors of employee resistance and to evaluate the association between employee resistance and injury. We began by using multivariate models to identify potential predictors of employee resistance. Separate multivariate models were used to calculate prevalence ratios for active and passive resistance compared with no employee resistance adjusting for potential confounders. Next, we calculated prevalence ratios comparing robberies that resulted in employee injury with those that did not result in employee injury. Both crude and adjusted prevalence ratios were calculated.

TABLE 1. Characteristics of Robberies Occurring Between 2008 and 2012 by Employee Injury, *N* (%)*

Characteristic	Employee Injured ($n = 1,134$)	No Employee Injury ($n = 2,641$)	Total ($n = 3,775$)	*P*
Business type				
Gas/convenience stores	279 (24.6)	794 (30.1)	1,073 (28.4)	0.371
Liquor/pharmacy/grocery stores	194 (17.1)	245 (9.3)	439 (11.6)	
Restaurants/bars	164 (14.5)	566 (21.4)	730 (19.3)	
Bank/credit union	20 (1.8)	301 (11.4)	321 (8.5)	
Other retail†	376 (33.2)	547 (20.7)	923 (24.5)	
Other‡	101 (8.9)	188 (7.1)	289 (7.7)	
Time of day				
6:00 AM–5:59 PM	529 (46.7)	1,039 (39.3)	1,568 (41.5)	<0.001
6:00 PM– 5:59 AM	605 (53.4)	1,602 (60.7)	2,207 (58.5)	
Employee resistance				
Active	558 (49.2)	513 (19.4)	1,071 (28.4)	<0.001
Passive	119 (10.5)	524 (19.8)	643 (17.0)	
No resistance	457 (40.3)	1,604 (60.7)	2,061 (54.6)	
Presence of customers				
Yes	132 (12.1)	425 (16.8)	557 (15.4)	<0.001
No	960 (87.9)	2,101 (83.2)	3,061 (84.6)	
Missing	42	115	157	
Any weapon use				
Yes	592 (52.5)	1,938 (73.6)	2,530 (67.3)	<0.001
No	536 (47.5)	695 (26.4)	1,231 (32.7)	
Missing	6	8	14	
Cash only stolen				
Yes	339 (30.6)	1,575 (63.1)	1,914 (53.1)	<0.001
No	769 (69.4)	922 (36.9)	1,691 (43.9)	
Missing	26	144	170	
Goods only stolen				
Yes	590 (52.7)	392 (15.5)	982 (26.9)	<0.001
No	529 (47.3)	2,138 (84.5)	2,667 (73.1)	
Missing	15	111	126	

*Percentages are column based.

†Other retail includes jewelry stores, retail nonspecified, cell phone stores, smoke shops, clothing stores, dollar stores, electronic stores, pawn shops, shoe stores, video stores, and game stores.

‡Other includes barber/beauty shops, hotel/motels, casinos, office space, post office, adult business, self-storage, and rental centers.

#There were 134 robberies in which the type of property stolen was listed as unknown.

The following covariates were included in the adjusted models: business type, presence of customers at the time of the event, time of day the event occurred, weapon use by the perpetrator, cash only stolen, and goods only stolen. Variables chosen to be included in the multivariate models were selected a priori based off previous literature.[19] Location of cash stolen variables was not included in the adjusted models for employee injury because they were not mutually exclusive of the cash only stolen variable. All analyses were carried out using Statistical Analysis Software Version 9.2 (Cary, NC). Statistical significance was set at $\alpha < 0.05$ using two-sided *P*-values.

RESULTS

A total of 3775 robberies occurred in the 4-year study period, of which 1134 (30.0%) resulted in employee injury (Table 1). Employees resisted the perpetrator in nearly half of the robbery events ($n = 1714$, 45.4%). Active employee resistance was noted in 1071 (28.4%) of the events, with passive resistance being less common in 643 robberies (17.0%). Type of employee resistance was significantly associated with employee injury ($P < 0.001$). Convenience and retail stores were most frequently targeted by perpetrators. Time of day the robbery occurred was significantly associated with employee injury, with more employee injuries occurring at night compared with during the day (53.4% vs 46.7%). Most robberies occurred when no customers were present ($n = 3061$, 84.6%). Employee injury was higher when only goods were stolen ($P < 0.001$) and lower when cash only was stolen ($P < 0.001$).

Given that employee resistance was found to be associated with employee injury, we examined whether the type of property or location of cash stolen influenced employee resistance. We stratified type of employee resistance by characteristics of property stolen in Table 2. Overall, any cash stolen, regardless of location, was associated with fewer cases of active employee resistance ($P < 0.001$). Nevertheless, the opposite was found for when goods only were stolen. Goods only stolen were associated with more cases of active employee resistance compared with passive or no resistance ($P < 0.001$). Most events resulted in cash being taken from the registers, few robberies involved only goods being taken. Overall, a median of $50 cash was stolen from all businesses, with a range of $0 to $571,309. Banks had the highest mean amount of cash taken with a mean of $4314 reported stolen (range: $0 to $141,050). The mean amount of cash taken from gas or convenience stores was $274 (range: $0 to $23,800).

Predictors of employee resistance seem to differ depending on type of resistance exhibited during the robbery (Table 3). Business type seemed to be protective of active resistance, but the opposite was found for passive resistance. Banks and restaurants seem to be associated with less active employee resistance compared with other business types. Passive resistance on the contrary seems to have the strongest association with other retail stores (Adj PR: 1.68, 95% confidence interval [CI], 1.25 to 2.23). Presence of customers does not seem to be associated with either type of employee resistance. The prevalence of active resistance seemed to be higher when robberies occurred during the day than robberies occurring at night (Adj PR: 1.15, 95% CI, 1.05 to 1.26). Finally, active resistance seemed to be associated with any property taken, regardless of whether goods or cash were stolen.

Employee injury was significantly associated with active employee resistance, even after adjustment for additional covariates (Adj PR: 1.49, 95% CI, 1.34 to 1.65) (Table 4). Passive resistance seemed to be associated with less employee injury; however, after adjustment for additional covariates this association became null (Adj PR: 0.93, 95% CI, 0.78 to 1.11). The prevalence of employee injury varied depending on business type. The prevalence of employee injuries was lower for employees working at banks or credit unions than for employees working at convenience stores (Adj PR: 0.29, 95% CI, 0.18 to 0.46). The presence of customers seemed to be inversely associated with injury in the crude model; however, after adjustment for additional covariates this association was close to

TABLE 2. Employee Resistance and Property Stolen, *N* (%)*

Covariate	Active Resistance ($n = 1,006$)	Passive Resistance ($n = 596$)	No Resistance ($n = 2,047$)	Total ($n = 3,649$)	*P*
Money stolen from register					
Yes	338 (34.4)	465 (79.8)	1,498 (74.2)	2,301 (64.2)	<0.001
No	644 (65.6)	118 (20.2)	522 (25.8)	1,284 (35.8)	
Missing	89	60	41	190	
Cash stolen from safe or hidden place					
Yes	64 (6.5)	82 (14.0)	280 (13.8)	426 (11.9)	<0.001
No	919 (93.5)	504 (86.0)	1,745 (86.2)	3,168 (88.2)	
Missing	88	57	36	181	
Cash stolen from employee					
Yes	38 (3.9)	68 (11.6)	204 (10.1)	310 (8.6)	<0.001
No	948 (96.2)	517 (88.4)	1,822 (89.9)	3,287 (91.4)	
Missing	85	58	35	178	
Cash only stolen					
Yes	308 (31.2)	390 (66.4)	1,216 (59.9)	1,914 (53.1)	<0.001
No	679 (68.8)	197 (33.6)	815 (40.1)	1,691 (46.9)	
Missing	84	56	30	170	
Goods only stolen†					
Yes	582 (57.9)	55 (9.2)	345 (16.9)	982 (26.9)	<0.001
No	424 (42.2)	541 (90.8)	1,702 (83.2)	2,667 (73.1)	
Missing	65	47	14	126	

*Percentages are column based.
†Goods stolen include surveillance tapes, medications, items from employees, automobiles, and computers.

TABLE 3. Prevalence Ratios (PR) and 95% Confidence Intervals (CI) for Active or Passive Employee Resistance Compared With No Resistance During a Robbery*

Covariate	Active Resistance PR (95% CI)	Passive Resistance PR (95% CI)
Business type		
Gas/convenience	Reference	Reference
Liquor/pharmacy/grocery	0.97 (0.86, 1.09)	1.34 (1.08, 1.66)
Restaurants	0.63 (0.50, 0.79)	1.30 (0.94, 1.82)
Bank/credit union	0.30 (0.19, 0.47)	1.28 (1.01, 1.62)
Other retail	0.94 (0.84, 1.05)	1.68 (1.25, 2.23)
Other	0.94 (0.77, 1.15)	1.18 (0.86, 1.63)
Presence of customers		
Yes	1.00 (0.88, 1.14)	0.92 (0.75, 1.13)
No	Reference	Reference
Time of day		
6:00 AM– 5:59 PM	1.15 (1.05, 1.26)	1.06 (0.89, 1.26)
6:00 PM–5:59 AM	Reference	Reference
Any weapon use		
Yes	0.73 (0.66, 0.82)	1.07 (0.88, 1.29)
No	Reference	Reference
Cash only stolen		
Yes	1.22 (0.99, 1.51)	0.92 (0.77, 1.10)
No	Reference	Reference
Goods only stolen		
Yes	2.67 (2.18, 3.27)	0.56 (0.41, 0.77)
No	Reference	Reference

*Covariates included in the model—business type, presence of customers, time of day, weapon use, cash only stolen, and goods only stolen.
CI, confidence intervals; PR, prevalence ratios.

null (Adj PR: 0.94, 95% CI, 0.83 to 1.08). Robbery events that involved the perpetrator using a weapon were significantly associated with employee injury, even after adjustment for additional covariates (Adj PR: 0.67, 95% CI, 0.61 to 0.73). Employee injury was more prevalent when only goods were stolen (Adj PR: 1.56, 95% CI, 1.33 to 1.82), whereas cash being stolen was associated with fewer employee injuries (Adj PR: 0.71, 95% CI, 0.60 to 0.83).

DISCUSSION

We found that employees displayed resistance in nearly half of all robbery events, and that active employee resistance during these events was significantly associated with employee injury. Goods being stolen were significantly associated with active employee resistance, whereas cash only being stolen was associated with a higher prevalence of either passive resistance or no resistance. This suggests that the threat of violence or injury to the employee while goods were stolen was less severe than when cash was stolen. Regardless, employee training in nonresistance can be an important strategy in protecting employees working with the exchange of cash and goods.

Given that the average amount stolen for most retail establishments was nearly $275, it suggests that businesses are not implementing cash handling policies. Previous research has found that reducing the amount of cash on hand can lower the risk of robbery.[16,20,21] The use of cash handling policies, such as limiting the amount of cash on hand or the use of a cash safe, has been found to reduce the number of robberies by as much as 38%.[15] Cash handling policies have been found to have high uptake when implemented in communities.[22] Results of this study indicate that there is a need to educate commercial businesses about the importance of cash handling procedures. Limiting the amount of cash on hand may reduce the sense that employees need to resist during robberies, and thus reduce the risk of employee injury.

There have been mixed findings regarding the influence of the time of day a robbery occurs and employee injury. In this study, we found that most robberies occurred at night, however employee injury was more prevalent when robberies occurred during the day. This is similar to the results found by Faulkner et al[16] in a study of employee injury and convenience store robberies. Nevertheless, previous studies have also found that employee injury is more common when workplace violence occurred at night.[23] Employees may feel less threatened approaching a perpetrator during day-time hours when customers are more likely to be present or when there are more passersby surrounding the business. It may also be that owners and managers are more likely to work during the day and be more inclined to protect cash and goods than hourly employees who may be working at night and have less of a personal attachment or responsibility to the business.

This study was subject to limitations primarily related to the use of secondary data. It is estimated that only 77% of workplace robberies are reported to the police.[3] Employees may be reluctant to report an injury to the police or their supervisor. Underreporting of employee injury on crime reports may have resulted in underestimated effect estimates. Also, because we were limited to secondary data, we were missing data for covariate information, especially regarding property stolen. Businesses that had small amounts of cash or goods stolen may have been less likely to report the item as stolen to the police. Therefore, our results regarding the value of cash or goods stolen may be inflated to represent those events in which large amounts of property were stolen. Finally, because of the cross-sectional nature of the study, results from this study cannot be taken as causal because we were unable to assess temporality.

TABLE 4. Unadjusted and Adjusted Prevalence Ratios (PR) and 95% Confidence Intervals (CI) for Employee Injury During a Robbery

Covariate	Unadjusted PR (95% CI)	Adjusted* PR (95% CI)
Employee resistance		
Active	2.35 (2.13, 2.59)	1.49 (1.34, 1.65)
Passive	0.83 (0.70, 1.00)	0.93 (0.78, 1.11)
No resistance	Reference	Reference
Business type		
Gas/convenience	Reference	Reference
Liquor/pharmacy/grocery	1.70 (1.47, 1.97)	1.02 (0.90, 1.16)
Restaurants	0.86 (0.73, 1.02)	1.15 (0.98, 1.35)
Bank/credit union	0.24 (0.15, 0.37)	0.29 (0.18, 0.46)
Other Retail	1.57 (1.38, 1.78)	1.16 (1.03, 1.29)
Other	1.34 (1.11, 1.62)	1.22 (1.08, 1.38)
Presence of customers		
Yes	0.76 (0.65, 0.88)	0.94 (0.83, 1.08)
No	Reference	Reference
Time of day		
6:00 AM–5:59 PM	1.23 (1.12, 1.36)	1.12 (1.03, 1.21)
6:00 PM–5:59 AM	Reference	Reference
Weapon used		
Yes	0.54 (0.49, 0.59)	0.67 (0.61, 0.73)
No	Reference	Reference
Cash only stolen		
Yes	0.39 (0.35, 0.43)	0.71 (0.60, 0.83)
No	Reference	Reference
Goods only stolen		
Yes	3.03 (2.76, 3.32)	1.56 (1.33, 1.82)
No	Reference	Reference
Cash stolen from register		
Yes	0.30 (0.27, 0.33)	NA
No	Reference	
Cash stolen from safe or hidden place		
Yes	1.22 (1.06, 1.40)	NA
No	Reference	
Cash stolen from employee		
Yes	0.97 (0.82, 1.16)	NA
No	Reference	

*Covariates included in the model—employee resistance, business type, presence of customers, time of day, weapon use, cash only stolen and goods only stolen.
CI, confidence intervals; NA, not available; PR, prevalence ratios.

There were several strengths to this study. First, this study included all types of commercial robberies regardless of business type. Past studies have been limited to one specific type of commercial business. By including all types of commercial businesses in this study, our results are generalizable to a wider array of commercial businesses. Second, we were able to gather specific details about individual robbery events through the use of police records. Individual police records provided information about specifics of the robbery such as type of property stolen, customers present at the time of the event, and financial cost of the robbery for store owners. Finally, few studies have examined the impact of employee resistance during robbery events. Given the detailed information in police reports, we were able to stratify types of employee resistance in this study.

CONCLUSIONS

Results from this study suggest that employee resistance is common among robbery events in commercial settings. Type of business, time of the robbery event, and type of property stolen may impact employee resistance and injury during robbery events. Furthermore, these factors seem to influence type of employee resistance differently, thus highlighting the need for more research in the types of employee resistance. Future occupational safety interventions need to be tailored to include employee training in nonresistance and further stress the importance of safe cash handling procedures to help prevent harm to the employee during robbery events.

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