Police Response to Homicide Crime Scenes: Testing the Effect of the Number of Police Officers and Investigators Responding to an Active Crime Scene on the Arrest Success Rate

Avdi S. Avdija

Purpose:

The purpose of this study is to investigate the effects that the first responders (police officers and investigators) have on the arrest success rates at homicide crime scenes. It attempts to determine whether or not increasing the number of officers (e.g., first line responders), and investigators responding to a homicide crime scene increases the arrest success rate, which contributes on the overall homicide clearance rates.

Design/Methods/Approach:

Using archived administrative data that were originally collected by the Phoenix Police Department, and sponsored by the United States Department of Justice, this study analyses 532 investigative reports. The types of cases analysed in this study are homicides crime scenes, which includes homicide victims and survivors.

Findings:

The findings in this study show that for every additional officer added to the number of police officers responding to the crime scene the arrest success rates increased by 8%, and for every additional investigator added to this first response, the arrest success rates increased by 24%. The number of witnesses and victims present at the crime scene did not have a significant effect on the arrest success rate of homicide cases.

Research Limitations/Implications:

This study is limited to examining the effects of the number of officers and investigators have on homicide clearance rates. It does not account for the limited departmental resources and their effects on the homicide arrest rates or clearance rates. Also, this study does not include factors that do not solely depend on the police response to homicide crime scenes (i.e., factors that the offenders have control over).

Practical Implications:

The methods that police use to respond to and investigate homicide cases can determine the outcome of a case. Depending on how the police decide to respond, ultimately increase or decrease the effectiveness of making an arrest or salve a homicide case. An increase in the arrest rate, by definition, results in an increase in the clearance rate of homicide cases. Thus, the study findings touch base on the importance and the role of the number of first line responders and investigators have on homicide arrest success rates.

Originality/Value:

This is the first study that has examined the effects of first responders on homicide arrest rates.

UDC: 343.98

Keywords: police, police response, investigation, arrest rates, homicides, clearance rates

Odziv policije na kaznivo dejanje umora: Testiranje vpliva števila policistov in kriminalistov, ki so se odzvali na storjeno kaznivo dejanje, na stopnjo uspešnosti odvzema prostosti

Namen prispevka:

Namen študije je proučiti vpliv, ki ga imajo na stopnjo uspešnosti odvzema prostosti policisti in kriminalisti, ki se na kaznivo dejanje umora odzovejo prvi. Avtor poskuša ugotoviti, ali povečanje števila policistov in kriminalistov, ki se prvi odzovejo na kaznivo dejanje umora, poveča stopnjo uspešnosti odvzema prostosti, kar vpliva na stopnjo preiskanosti.

Metode:

V študiji so uporabljeni arhivirani administrativni podatki, ki jih je zbrala policija iz Phoenixa, njihovo uporabo pa je omogočilo Ministrstvo za pravosodje Združenih držav Amerike. V študijo je vključenih 532 preiskovalnih poročil kaznivih dejanj umorov in poskusov umorov.

Ugotovitve:

Ugotovitve študije so pokazale, da se je z vsakim dodatnim policistom na kraju kaznivega dejanja stopnja uspešnosti odvzema prostosti storilcu povečala za 8 %, z vsakim dodatnim kriminalistom pa za 24 %. Število prič in žrtev na kraju kaznivega dejanja pa na stopnjo uspešnosti odvzema prostosti v primerih umora ni imelo vpliva.

Omejitve raziskave:

Študija je omejena na proučevanje učinkov števila policistov in kriminalistov na stopnjo preiskanosti umorov. Študija ne upošteva omejenosti virov, s katerimi se sooča policija, in njihovega vpliva na uspešnost reševanja umorov in stopnjo odvzema prostosti. Študija prav tako ne vključuje dejavnikov, ki niso odvisni samo od odziva policije na storjeno kaznivo dejanje umora (npr. dejavnikov, nad katerimi imajo nadzor storilci).

Praktična uporabnost:

Metode, ki jih policija uporablja pri odzivanju in preiskovanju umorov, lahko vplivajo na izid primera. Učinkovitost odvzema prostosti ali preiskovanja umora se bo povečala ali zmanjšala glede na odziv policije. Povečanje uspešnosti stopnje odvzema prostosti, pomeni tudi povečanje stopnje preiskanosti. Ugotovitve študije torej izpostavljajo pomembnost in vlogo števila policistov in kriminalistov, ki se prvi odzovejo na storjeno dejanje, na stopnjo uspešnosti odvzema prostosti v primerih umora.

Izvirnost/pomembnost prispevka:

To je prva študija, ki je preučila učinke števila oseb, ki se prve odzovejo na storjeno kaznivo dejanje umora, na stopnjo uspešnosti odvzema prostosti.

UDK: 343.98

Ključne besede: policija, odziv policije, preiskovanje, stopnja odvzema prostosti, umori, stopnja preiskanosti

1 INTRODUCTION

1.1 Investigative Failures

Homicide investigations can fail for a number of reasons. On one hand, the most obvious reasons include the lack of police resources (Wellford & Cronin, 2000), less than adequate police response to crime scenes, improper treatment of the crime scenes (i.e., failure to prevent crime scene contamination), etc. Investigations also fail due to cognitive bias, probability errors, and investigator's overconfidence (Rossmo, 2008, 2006). On the other hand, there are factors beyond an investigator's control. Such factors include lack of solvability factors that do not solely depend on the police response (i.e., factors that the offenders have control over). Nonetheless, the biggest failure in the criminal investigation of cases is a failure to correct the known problems. Knowing that the same investigative methods or procedures produce the same failed outcome, and not addressing those known problems is a failure to recognize self-weaknesses. Sometimes, this problem is directly related to the resistance to change – due to fear of the unknown. From the perception point of view, confirmatory bias is among the most serious factors that need to be addressed. Confirmation bias is a type of selective thinking where an investigator is likely to search and notice only the evidence that confirms his theory while failing to assess the evidence that contradicts his conclusions (Rossmo, 2008). In essence, confirmation bias is a form of tunnel-vision, which is an investigative failure that could send a case as far as to a wrongful conviction of an innocent person (Bell, Clow, & Ricciardelli, 2008; Findley, 2012; McFarlane, 2008). This is oftentimes as a direct result of over-confidence that is built based on the un-reviewed/un-evaluated experience that comes from a specific mindset, not open to constructive criticism. Despite these influencing factors, people ask what can be done to improve success. The best way to approach this concern is to focus on changing what is changeable – to change things that are within reach. For homicide cases, adding more officers, better coordination between units, and fast

responses to such incidents are usually within reach. The current study focuses on testing investigative elements that the police have control over. In this aspect, this study asks the question: what would happen if you increase the number of first responders (e.g., police officers and investigators) to an active homicide crime scene. Would it help improve the arrest rates in homicide cases? An improvement in arrest rates, in turn, contributes to an increase in the homicide clearance rates.

1.2 Solvability Factors

Without solvability factors, a homicide case is most likely to be declared a cold case. Solvability factors are bits of pieces of information that help solve cases. They are rank-ordered based on the importance and the relevance to the case. Those factors are further classified as solvability factors that the police/investigators have control over (i.e., how fast they respond to the crime scene, experienced first responders or investigators properly securing the crime scene, minimizing the contamination of the crime scene, effective communication between police units at the crime scene, etc.) and solvability factors that are beyond investigator's control (i.e., the presence of witnesses at the crime scene, time of crime occurrence and the location of the crime, both are controlled by the offender, the presence of physical evidence left at the crime scene, etc.). The higher the number of solvability factors, the higher the chance of solving a homicide case (Hirschy, 2003; Keppel & Weis, 1992). In their study, Wellford and Cronin (2000) identified about 51 significant solvability factors that were with great importance in solving homicide cases. Thirty-seven of those 51 solvability factors were factors that the police and investigators had control over (Wellford & Cronin, 2000). While the police cannot control factors that are beyond their reach, one important solvability factor that they can control is the time and distance between the police and the crime scene. Research shows that time and distance between the police and the crime scene both are significant factors in solving murder cases (Greenwood & Petersilia, 1975; Weis & Keppel, 1994). According to Wellford and Cronin (2000), the time notification that the first responding officers make to the homicide unit has a significant impact on the homicide clearance rate. This means that the quicker the response and coordination between the units, the higher the chance of solving a homicide case, which is a burden that falls on the police agency at the strategic level (Brookman, Maguire, & Maguire, 2018). On the other hand, an important factor that is beyond an investigator's control is the time of the homicide occurrence, which is controlled by the offender. According to Mouzos and Muller (2001), homicide cases that occurred between 6:00 pm to 6:00 am were less likely to be solved compared to cases that occurred during the day time (also see Alderden & Lavery, 2007). In addition, the number of victims and witnesses at the crime scene also affect the clearance rate in homicide cases. In this aspect, research shows that homicide cases involving only one victim had a higher failed solvability rate compared to homicides with multiple victims (Mouzos & Muller, 2001).

1.3   The Witness Factor

The presence of witnesses at the crime scene can significantly improve homicide clearance rates (Roberts, 2007; Wellford & Cronin, 1999). On the other hand, the absence of witnesses can bring to a halt the entire homicide investigation (Mouzos & Muller, 2001). However, the witness factor should be considered effective only if the police meet the response time by responding fast to a crime scene. Fast police response in homicide cases is correlated with the accuracy of the information they receive from witnesses. This means that as time goes by, an effective recollection of the event by the witnesses can degrade significantly. The longer it takes for the police to respond to the crime scene, the less accurate and clear the witness statement will be (Keppel & Weis, 1992). Needless to say, eyewitness identification, by nature, is flawed, misleading, and in many cases inaccurate (Megreya & Burton, 2008; Wells, Steblay, & Dysart, 2011). By definition, eyewitness identification is unreliable and the investigators should not rely too much on it in an attempt to increase the homicide clearance rates. Nonetheless, to reduce the inaccuracy of eyewitness information, it follows that the police should decrease the response time to crime scenes. That way, there will be fewer memory recall problems with the eyewitnesses.

1.4   Arrest Rates for Violent Crimes

The percentage of unsolved homicide cases in the United States is about 39.3% (Uniform Crime Reports, 2017).[1] This is an alarming rate when considering the seriousness of this type of offense. Even more alarming is the percentage of unsolved rape cases (65.5%), robbery cases (70.3%), and aggravated assault cases, 46.7% (Uniform Crime Reports, 2017). To increase the arrest success rates for violent crimes, researchers suggest improving several factors; namely reducing administrative influences, broadening the information processing capabilities, improving the response time, and personnel coordination (i.e., first line responders coordinating with investigators). The first and most important factor that affects the arrest success and clearance rates is police response time. Research shows that fast police response to the crime scene helps preserve physical evidence that is found at the scene and, as discussed above, it helps prevents contamination of the crimes scene (Regoeczi, Jarvis, & Riedel, 2008; Richardson & Kosa, 2001), which in turn helps speed up the case. The second factor that is worthy of consideration in improving homicide clearance rates is the reduction of administrative influence on the investigator's work. In an attempt to increase the overall clearance rates, some police administrators put too much pressure on investigators, which in turn can lead to an increase in false confessions. This occurs when instigators inflate overall clearance rates by pressuring people to confess or admit crime involvement in other cases beyond the case at hand (Jarvis, Mancik, & Regoeczi, 2017; Kassin, 2008). By reducing administrative pressure, it follows that the clearance rate will

---

1   *The percentage of unsolved murder cases is being used in reference to cases that have not been cleared by arrest or exceptional means as reported by the FBI's Uniform Crime Report (2017).*

be uncontaminated and healthy. The success rates should be measured in terms of quality and not in terms of the quantity of cases. Another related factor is information processing scope. Broadening the search in the process of collecting and analysing information helps develop new leads, which in turn affects the case clearance rates (Richardson & Kosa, 2001; Weisburd & Eck, 2004).

Arrest rates for violent crimes have a dual-role effect on society. Increasing arrest rates for violent crimes is usually manifested in a form of a deterrence effect. This means, when the punishment is swift, certain, and severe enough, fewer offenders are willing to engage in such criminal behaviours (Berk, Campbell, Klap, & Western, 1992; Levitt, 1998; Sherman & Berk, 1984). The second effect of an increase in arrest rate is manifested with an increase in citizen satisfaction with the police. When people know that their police force is effective, fear of crime goes down. Along this line, research shows that people are less afraid of criminal victimization when they are more satisfied with police work (Ratcliffe, Taniguchi, Groff, & Wood, 2011).

2   CURRENT STUDY

In an attempt to examine arrests rates in homicide cases, this study focuses on investigating the effect that the number of first responders (e.g., police officers and investigators) has on the arrest success rates made shortly after their arrival at the crime scene. The types of cases analysed in this study are homicides scenes, which includes homicide victims and survivors. The analyses are based on 532 investigative reports. This study attempts to examine the following effects:

   a. The effect that the number of first responders has on the arrest success rates made shortly after their arrival at the crime scene.
   b. What type of homicide cases (e.g., drug-related homicide cases, gang-related homicide cases, robbery-related homicide cases, etc.) produce a higher arrest rate made immediately upon arrival at the crime scene?
   c. For better results, this study controls for the effects of domestic violence cases.[2]

3   METHOD
3.1   The Data

The analyses in this study are based on archived police administrative data that were originally collected by the Phoenix Police Department, and sponsored by the United States Department of Justice. This includes a total of 532 investigative reports of homicide cases in which victims were either killed or survived. The

---

2   *The domestic violence was used as a control variable because the results would be sewed if it was included/ interpreted in the context of the outcome variable. In most instances, domestic violence cases have a known suspect which would inevitably result with an arrest later on, and the cases would not have been coded as "open." For this reason, domestic violence was listed as a control variable.*

data were released to the public in 2011 by the Interuniversity Consortium for Political and Social Research (ICPSR). The victims that are represented in the administrative police reports ranged in age from less than a year old to 93 years old (M = 30.6, SD = 13.01). Most of the victims (68.6%) were less than 34 years of age. In terms of gender, 84% were males and 16% females. Additionally, most of the victims were whites (83.6%) and 16.4% non-whites. As a limitation to these data, it is worthy to note that this study does not include solvability factors that do not solely depend on the police response (i.e., factors that the offenders have control over). It focuses on testing investigative elements that the police have control over.

3.2   Dependent and Independent Variables

The dependent variable in this study is the arrest success rate made shortly after police arrival at the crime scene. Since the data in this study are administrative police reports, cases were coded with a final outcome of "arrest made at the crime scene either immediate or quick action arrest" or "open cases." The outcome variable includes both immediate arrests and quick action arrests combined into one. Immediate arrest cases are those in which the suspect is immediately identified and arrested - usually at the crime scene or within a few blocks of the crime scene. A quick action arrest, on the other hand, refers to police arrests in which the suspect is not immediately identified or the location of a suspect is not immediately obvious when investigators arrive at the crime scene. In comparison to the above two types of arrests, open cases are those cases that do not have a named suspect, or due to lack of solvability factors, they are more likely to go cold. To put this in a time frame context, open cases remain open for months or years, vs. cases that are immediately solved or within hours (are referred to as immediate arrest or quick action arrests). The dependent variable in this study is coded dichotomously with binary response categories (arrests are coded 1, open cases are coded 0). Thus, the final outcome was measured as a binary variable.

Table 1. Description of variables

Variables	Description	Min	Max	Mean	S.D.
Number of Victims	Continuous	1	10	1.41	1.02
Number of Witnesses	Continuous	0	31	4.56	4.31
Victim's Age	Measured in continuous years	0	93	30.60	13.01
Victim's Gender	Male 84% (coded 1) Female 16% (coded 0)	0	1	.84	.367
Victim's Race	White 83.6% (coded 1), Non-White 16.4% (coded 0)	0	1	.84	.370
Domestic Violence	11.7% Yes (coded 1) 88.3% No (coded 0)	0	1	.12	.321
Drug-Related Crime	17.7% Yes (coded 1) 82.3% No (coded 0)	0	1	.18	.382
Gang-Related Crime	9.6% Yes (coded 1) 90.4% No (coded 0)	0	1	.10	.295
Robbery-related Crime	15% Yes (coded 1) 85% No (coded 0)	0	1	.15	.358
Victim Killed/Injured	81.8% Yes (coded 1) 18.2% No (coded 0)	0	1	.82	.386
Number of Patrol Officers	Continuous	0	28	7.70	5.71
Number of Investigators	Continuous	1	17	5.25	2.34
Immediate/Quick Action Arrest	27.3% Arrests (coded 1) 53.9% Open (coded 0) 18.8% Others/missing (coded 99)	0	1	.34	.47

Note: *Min* stands for minimum value, *Max* for maximum value, *S.D.* stands for standard deviation value, and *Mean* stands for the arithmetic average.

The main independent variables, on the other hand, include the number of patrol officers responding to the crime scene, and the number of investigators. As shown in Table 1, both are continuous numerical variables. Other important variables that were included in the model are the different types of crime cases such as drug-related cases, gang-related cases, robbery cases, domestic violence cases, and murder cases in which the victim was either killed or injured. All of these variables were dichotomously coded, with Yes/No response categories. Control variables in this study are the victim's age, gender, race, the number of victims, and the number of witnesses present at the crime scene. It is worthy to note that domestic violence is also used as a control variable in this study. Furthermore, since the dependent variable was binary in nature, with only two outcomes, ranging from 0 to 1, Multiple Logistic Regression analysis was used to analyse the data. Logistic Regression is a binary regression that works best when the outcome is dichotomous in nature (Pallant, 2011).

The duties and responsibilities of police officers and investigators at the crime scene overlap significantly. Thus, for research purposes, it is a concern that there might be some issues with multicollinearity among these two predictors. Multicollinearity occurs "when two or more predictors contain much of the same information" (Leech, Barret, & Morgan, 2012, p. 107). Each predictor in the model needs to offer a unique contribution without reference to other predictors in the model. To address this concern, two types of statistical analyses were computed; namely, the correlation matrix and collinearity diagnostics. These analyses are presented in Table 2. The technicalities for evaluation multicollinearity are as follow: the threshold for the Variance Inflation Factor values (VIF) is 3. Anything above 3 is an indicator of multicollinearity issue with the correlates. Anything above 5 (with the corresponding tolerance value of .2 or less) is a serious indicator of multicollinearity issue with the correlates. The VIF of 10 (with the corresponding tolerance value of .1) is a definite indicator of multicollinearity (see Field, 2009; Pallant, 2011).

Table 2. Assessing multicollinearity between two main predictors

Person Correlation Matrix		*Mean*	*S.D.*	Collinearity Diagnostics	
vs.	Number of Patrol Officers			Tolerance Value	VIF Value
Number of Investigators	.554***	5.25	2.34		
	.000			.616	1.623

Note: VIF stands for *Variance Inflation Factor* value. S.D. stands for *Standard Deviation* value.
*** $p < .001$

The multicollinearity diagnostic analyses in Table 2 show that the two independent variables included in the model (see Tables 3 and 4) did not violate the assumption of multicollinearity. Even though the correlation matrix shows that these two variables were moderately correlated (r = .554, p < .001), the Tolerance Value (.616) and the Variance Inflation Factor value (*VIF* = 1.623) were within the normal range, substantially below the cut off values. This evidence shows that the number of police officers and the number of detectives/investigators responding to the crime scene, as two independent variables, explain enough independent and unique variance in the model.

4   RESULTS

The first objective of this study is to examine the effects of the number of first responders (e.g., police officers and investigators) on the arrest success rates made shortly after their arrival at the crime scene. The second objective is to examine what type of crime cases (e.g., drug-related cases, gang-related cases, robbery-related cases, etc.) produce a higher arrest rate made immediately upon arrival at the crime scene? To address these two objectives, the Logistic Regression analyses are computed and presented in Tables 3 and 4. The main model in Table 3 contained twelve independent variables. The full model was statistically significant, χ^2 (12, N = 432) = 104.50, p < .001, and it explained about 30% (Nagelkerke R-squared)

of the variation in arrest success rates made shortly after police responded to the crime scenes. This explained variation is presented in the form of a proportional reduction in the absolute value of the log-likelihood. Additionally, this model correctly classified 75.7% of cases.

As shown in Table 3, only three variables made a unique and significant contribution to the mode; namely the number of patrol officers, the number of investigators, and domestic violence, a type of crime that is used as a control variable in this model. Of the two main predictors of arrest success rates, the number of investigators responding to the crime scene recorded an odds ratio of 1.243, $p < .001$, (95% CI: 1.094, 1.413), followed by the number of patrol officers responding to the crime scene, $b = .077$, $p = 01$, $OR = 1.080$ (95% CI: 1.024, 1.139). This indicates that the higher the number of investigators and patrol officers responding to a crime scene, regardless of the type of crime, the higher the chances of making an immediate arrest, controlling for all other variables in the model. For every additional officer added to the number of officers responding to the crime scene, the arrest rates increased by 8%. On the other hand, for every additional investigator added to the number of investigators responding to the crime scene, the arrest rates increased by 24%. Interestingly enough, the number of witnesses present at the crime scene, the number of victims, and victim's demographic characteristics (e.g., age, gender, and race) did not have a statistically significant effect on the arrest rates.

Table 3. Logistic Regression: predicting immediate/quick action arrest at the crime scene

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
Number of Victims	.127	.237	.287	.592	1.135	.714	1.805
Number of Witnesses	.033	.037	.788	.375	1.033	.961	1.111
Victim's Age	.008	.009	.801	.371	1.008	.990	1.026
Victim's Gender	.152	.346	.192	.661	1.164	.591	2.293
Victim's Race	-.400	.322	1.544	.214	.670	.356	1.260
Domestic Violence	2.201	.391	31.755	.000	9.035	4.202	19.429
Drug-Related Crime	-.277	.337	.676	.411	.758	.391	1.468
Gang-Related Crime	-.748	.464	2.595	.107	.473	.190	1.176
Robbery-Related Crime	-.653	.376	3.015	.083	.520	.249	1.088
Victim Murdered/Injured	-.147	.455	.104	.747	.863	.354	2.108
Number of Patrol Officers	.077	.027	8.136	.004	1.080	1.024	1.139
Number of Investigators	.218	.065	11.083	.001	1.243	1.094	1.413
Constant	-2.796	.871	10.299	.001	.061	----	----
(Cox & Snell) R^2 = .215		(Nagelkerke) R^2 = .298			Correct Classification of Cases 75.7%		

Table 4 shows a more parsimonious model with only three variables. This model explains about 27% (Nagelkerke R-squared) of the variation in the arrest rates mate immediately after responding to the crime scenes. Again, this variation is presented in the form of a proportional reduction in the absolute value of the log-likelihood. Considering that this model has only three variables, the explanation power did not differ by much (27%) compared to the main model with twelve variables, which explained about 30% of the variation in the arrest rates. Thus, the three-variable model in Table 4 has a better goodness-of-fit.

Variables	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
Domestic Violence	2.330	.363	41.110	.000	10.276	5.041	20.948
Number of Patrol Officers	.093	.023	15.733	.000	1.097	1.048	1.149
Number of Investigators	.184	.057	10.504	.001	1.202	1.076	1.344
Constant	-2.722	.314	75.115	.000	.066	----	----

(Cox & Snell) R^2 = .196 (Nagelkerke) R^2 = .272 Correct Classification of Cases 76.9%

Table 4. Logistic regression: Predicting immediate/ quick action arrest at the crime scene

Note: Domestic violence is a control variable in this model.

5   DISCUSSION

A significant percentage of both violent and non-violent crimes are never salved by the police because the police are unable to make an arrest. Some of these crimes remain unsolved due to lack of solvability factors (e.g., no eyewitnesses, no physical evidence, no known suspects, no leads, lack of police resources, etc.), while others remain unsolved due to investigative failures (Rossmo, 2008). According to the FBI's Uniform Crime Report (2017) data, the number of arrests for serious crimes (e.g., murder and non-negligent manslaughter, rape, robbery, aggravated assault, etc.) doesn't reach half of all actual crimes that occur. The UCR data show that in 2017 the total number of cleared cases by arrest or exceptional means for homicide and non-negligent manslaughter was slightly better than other types of crime, reaching 61.6%. The clearance rate for rape cases was 34.5%, and for robbery cases was even lower with only 29.7% of the cases. The overall clearance rate for all violent crimes (cleared by arrest or exceptional means) was 45.6% (Uniform Crime Report, 2017), which is very low considering the magnitude of these violent crimes. This is not unexpected because this percent of arrest clearance rates has been low continuously since 1997 (Riedel & Jarvis, 1999). This shows that an effective response to a crime scene is relatively important in the outcome of both making an immediate arrest and/or salving the case later through the follow-up investigative process. The relevancy of the current study is derived from the above facts in regards to the overall clearance rates made by arrest or exceptional means. While the current study has a limited explanation power in the arrest success rates, it points out to the importance of the number of officers and investigators responding to a crime scene as significant factors in arrest success rates for homicide cases.

From the data analysis in this study, the research findings are pretty straight forward. This study shows that for every additional officer added to the number of officers responding to a crime scene, the arrest success rates increase by 8%. On the other hand, for every additional investigator added to the number of investigators responding to the crime scene, the arrest success rate increases by 24%. This suggests that police effectiveness increases through a well-coordinated response to crime scenes. Furthermore, perhaps the most interesting findings that emerged in this study are the insignificant effects of the number of witnesses at the crime scene and the type of crime. The number of witnesses and victims at the crime scene did not help significantly increase the arrest success rates, nor did the type of crime. Both were unexpected findings because prior research shows that the number of eyewitnesses at the crime scene helps increase the clearance rates

for violent crimes (Mouzos & Muller, 2001; Wellford & Cronin, 2000). Also, both the presence of witnesses and victims at the crime scenes are considered valuable solvability factors in the follow-up investigation of those crimes.

Moreover, the current study shows that the type of crime was not statistically significant in predicting the arrest success rates in homicide cases. For example, drug-related homicides compared to gang-related homicides or robbery-related homicides did not significantly affect the arrest success rates. Since homicide clearance rate is affected by arrest or exceptional means, in the context of existing literature, these findings are only partially supported. Prior research shows that drug-related homicides were insignificant in terms of clearance rates (Puckett & Lundman, 2003). On the other hand, there is research that shows gang-related homicides are significantly related to the clearance rates (Alderden & Lavery, 2007). Roberts (2007) also found that both gang-related and drug-related homicides had a higher clearance rate. This shows that more research is needed to determine the causal effects of the types of homicide on arrest success rates and the clearance rates.

To help readers better understand the context of these research findings, it is noteworthy to discuss some of the limitations of the current study. One of the limitations of this study is that it does not account for the limited departmental resources and their effect on the homicide arrest rates or clearance rates, which could be significant and substantial. Second, this study does not include solvability factors that do not solely depend on the police response (i.e., factors that the offenders have control over). It focuses on testing investigative elements that the police have control over. Future research could address the above effects as well as other factors such as the effect of poor vs better coordination between police units on homicide arrest rates, and the effects of administrative influence on homicide investigators/detectives. When considering the above limitations, the research findings of the current study partially suggest the implementation of targeted policing – specifically by focusing on implementing directed patrol operations, which focus on high crime areas (e.g., hot spots). This helps reduce the police response time to homicide crime scenes without stretching out the department resources, which in turn helps increase the arrest success rates.

REFERENCES

Alderden, M. A., & Lavery, T. A. (2007). Predicting homicide clearances in Chicago: Investigating disparities in predictors across different types of homicide. *Homicide Studies, 11*(2), 115–132. doi:10.1177/1088767907300505

Bell, J. G., Clow, K. A., & Ricciardelli, R. (2008). Causes of wrongful conviction: Looking at student knowledge. *Journal of Criminal Justice Education, 19*(1), 75–96. doi:10.1080/10511250801892979

Berk, R. A., Campbell, A., Klap, R., & Western, B. (1992). The deterrent effect of arrest in incidents of domestic violence: A Bayesian analysis of four field experiments. *American Sociological Review, 57*(5), 698–708. doi:10.2307/2095923

Brookman, F., Maguire, E. R., & Maguire, M. (2018). What factors influence whether homicide cases are solved? Insights from qualitative research with detec-

tives in Great Britain and the United States. *Homicide Studies, 23*(2), 145–174. doi:10.1177/1088767918793678

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage.

Findley, K. A. (2012). Tunnel vision. In B. L. Cutter (Ed.), *Conviction of the innocent: Lessons from psychological research* (pp. 303–323). Washington: American Psychological Association Press.

Greenwood, P. W., & Petersilia, J. (1975). *The criminal investigation process. Vol. I: Summary and policy implications*. Washington: U.S. Department of Justice, National Institute of Justice.

Hirschy, T. (2003). *Usual suspect: Do solvability factors predict case investigation outcomes for the Dublin.* Dublin: Ohio Division of Police.

Jarvis, J. P., Mancik, A., & Regoeczi, W. C. (2017). Police responses to violent crime: Reconsidering the mobilization of law. *Criminal Justice Review, 42*(1), 5–25. doi:10.1177/0734016816684198

Kassin, S. M. (2008). False confessions: Causes, consequences, and implications for reform. *Current Directions in Psychological Sciences, 17*(4), 249–253. doi:10.1111/j.1467-8721.2008.00584.x

Keppel, R. D., & Weis, J. G. (1992). *Improving the investigation of murder: An analysis of the effect of time and distance relationships in murder investigations*. Washington: National Institute of Justice. Retrieved from https://www.ncjrs.gov/pdffiles1/Digitization/138620NCJRS.pdf

Leech, N. L., Barret, K. C., & Morgan, G. A. (2012). *SPSS for intermediate statistics: Use and interpretation* (4th ed.). New York: Taylor & Francis.

Levitt, S. D. (1998). Why do increased arrest rates appear to reduce crime: Deterrence, incapacitation, or measurement error? *Economic Inquiry, 36*(3), 353–372. doi:10.1111/j.1465-7295.1998.tb01720.x

McFarlane, B. A. (2008). *Wrongful convictions: The effect of tunnel vision and predisposing circumstances in the criminal justice system.* Toronto: Government of Ontario.

Megreya, A. M., & Burton, A. M. (2008). Matching faces to photographs: Poor performance in eyewitness memory (without the memory). *Journal of Experimental Psychology, 14*(4), 364–372. doi:10.1037/a0013464

Mouzos, J., & Muller, D. (2001). *Solvability factors of homicide in Australia: An exploratory analysis.* Canberra: Australian Institute of Criminology.

Puckett, J. L., & Lundman, R. J. (2003). Factors affecting homicide clearances: Multivariate analysis of a more complete conceptual framework. *Journal of Research in Crime and Delinquency, 40*(2), 171–193. doi:10.1177/0022427803251125

Pallant, J. (2011): *SPSS: Survival manual* (4th ed.). Crow's Nest: Allen & Unwin.

Ratcliffe, J. H., Taniguchi, T., Groff, E. R., & Wood, J. (2011). The Philadelphia foot patrol experiment: A randomized controlled trial of police patrol effectiveness in violent crime hotspots. *Criminology, 49*(3), 795–831. doi:10.1111/j.1745-9125.2011.00240.x

Regoeczi, W. C., Jarvis, J., & Riedel, M. (2008). Clearing murder: Is it about time? *Journal of Research in Crime and Delinquency, 45*(2), 142–162. doi:10.1177/0022427807313706

Richardson, D. A., & Kosa, R. (2001). *An examination of homicide rates: Foundation for development of homicide clearance model*. Washington: Police Executive Research Forum. Retrieved from https://www.publicsafety.gc.ca/lbrr/archives/cnmcs-plcng/cn35337-eng.pdf

Riedel, M., & Jarvis, J. (1999). The decline of arrest clearances for criminal homicide: Causes, correlates, and third parties. *Criminal Justice Policy Review, 9*(3), 279–306. doi:10.1177/088740349900900302

Roberts, A. (2007). Predictors of homicide clearance by arrest: An event history analysis of NIBRS incidents. *Homicide Studies, 11*(2), 82–93. doi:10.1177/1088767907300748

Rossmo, K. (2006). Criminal investigative failures: Avoiding the pitfalls. *FBI Law Enforcement Bulletin, 75*(9), 1–8. Retrieved from https://leb.fbi.gov/file-repository/archives/sept06leb.pdf/view

Rossmo, K. (2008). *Criminal investigative failures*. Bocan Raton: CRC Press.

Sherman, L. W., & Berk, R. A. (1984). The specific deterrent effects of arrest for domestic assault. *American Sociological Review, 49*(2), 261–272. doi:10.2307/2095575

Uniform Crime Report. (2017). *Percent of offenses cleared by arrest or exceptional means by population group, 2017*. Washington: FBI. Retrieved from https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/tables/table-25

Weis, J. G., & Keppel, R. D. (1994). Time and distance as solvability factors in murder cases. *Journal of Forensic Science, 39*(2), 386–401. doi:10.1520/JFS13610J

Weisburd, E. L., & Eck, J. E. (2004). What can the police do to reduce crime disorder, and fear? *The Annals of the American Academy of Political and Social Science, 593*(1), 42–65. doi:10.1177/0002716203262548

Wellford, C., & Cronin, J. (1999). *An analysis of variables affecting the clearance of homicides: A multistate study*. Washington: Justice Research and Statistics Association. Retrieved from http://www.jrsa.org/pubs/reports/homicides_report.pdf

Wellford, C., & Cronin, J. (2000). Clearing up homicide clearance rates. *National Institute of Justice Journal*, (April), 1–7. Retrieved from https://www.ncjrs.gov/pdffiles1/jr000243b.pdf

Wells, G. L., Steblay, N. K., & Dysart, J. E. (2011). *A test of the simultaneous vs. sequential lineup methods: An initial report of the AJS national eyewitness identification field studies*. Des Moines: American Judicature Society.

About the Author:

Avdi S. Avdija, PhD, is an Associate Professor of Criminology and Criminal Justice at the Indiana State University, U.S.A. E-mail: avdi.avdija@indstate.edu