

Law Enforcement Suicide: A National Analysis

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Abstract: Previous research suggests that there is an elevated risk of suicide among workers within law enforcement occupations. The present study examined the proportionate mortality for suicide in law enforcement in comparison to the US working population during 1999, 2003-2004, and 2007, based on Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health National Occupational Mortality Surveillance data. We analyzed data for all law enforcement occupations and focused on two specific law enforcement occupational categories—detectives/criminal investigators/police and corrections officers. Suicides were also explored by race, gender and ethnicity. The results of the study showed proportionate mortality ratios (PMRs) for suicide were significantly high for all races and sexes combined (all law enforcement - PMR=169, 95% CI=150-191, $p<0.01$, 264 deaths; detectives/criminal investigators/police - PMR=182, 95% CI= 150-218, $p<0.01$, 115 deaths; and corrections officers- PMR=141, 95% CI=111-178, $p<0.01$, 73 deaths). Detectives/criminal investigators/police had the higher suicide risk (an 82% increase) compared to corrections officers (a 41% increase). When analyzed by race and sex, suicide PMRs for Caucasian males were significantly high for both occupations—detectives/criminal investigators/police (PMR= 133; 95% CI=108-162, $p<0.01$; corrections officers-- PMR=134, 95% CI=102-173, $p<0.01$). A significantly high (PMR=244, $p<0.01$, 95% CI=147-380) ratio was found among Hispanic males in the law enforcement combined category, and a similarly high PMR was found among Hispanic detectives/criminal investigators/police (PMR=388, $p<0.01$, 95% CI=168-765). There were small numbers of deaths among female and African American officers. The results included significantly increased risk for suicide among detectives/criminal investigators/police and corrections officers, which suggests that additional study could provide better data to inform us for preventive action. [International Journal of Emergency Mental Health and Human Resilience, 2013, 15(4), pp. 289-298].

Key words: Suicide, police, corrections, gender, race

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INTRODUCTION

A good amount of epidemiological evidence suggests that there is an elevated rate of suicide within law enforcement. Vena, Violanti, Marshall, and Fiedler (1986) found male officers to have an age-adjusted mortality ratio for suicide of approximately three times that of male municipal workers in the same cohort. A mortality study of police officers in Rome, Italy found the suicide ratio among male police officers to be 1.97 times as high as the general male Italian population (Forastiere, Perucci, DiPietro, Miceli, Rapi, Bargagli, et al., 1994). Charbonneau (2000), in a study in Quebec, Canada, found police suicide rates to be almost twice that of the general population. Rates were elevated mostly among young officers (20-39 years of age).

Berg, Hem, Lau, Loeb, and Ekeberg (2003), in a nationwide study on suicide ideation and attempts among 3272 Norwegian police, found that 24% felt that life was not worth living, 6.4% seriously considered suicide, and 0.7% attempted suicide. Serious suicide ideation was mainly attributed to personal and family problems. Violanti (2004) found that certain traumatic police work exposures increased the risk of having a high level of posttraumatic stress disorder (PTSD) symptoms, which subsequently increased the risk of alcohol use and suicide ideation. The combined impact of PTSD and increased alcohol use led to a ten-fold increased risk of suicide ideation.

Depression, possibly associated with work stress and suicide ideation, may be possible precipitants of increased police suicide risk. Violanti, Fekedulgen, Andrew, Hartley, Manatskanova, and Burchfiel (2008) examined the association between depressive symptoms and suicide ideation in a sample of police officers. Prevalence of depression was higher among female than male officers (12.5% vs. 6.2%). For each standard deviation increase in depression symptoms, the prevalence ratio (PR) of suicide ideation increased 73% in female officers (PR = 1.73, 95% CI = 1.32-2.27) and 67% in male officers (PR = 1.67, 95% CI = 1.21-2.30). A cross-sectional study by Violanti, Charles, Hartley, Mnatsakanova, Andrew, Fekedulegn et al., (2008) assessed the association of shift work with suicide ideation among police officers. Among policewomen with increased depressive symptoms, prevalence of suicide ideation increased by 116% for every 10-unit increase in percentage of hours worked on day shift. Among policemen with more symptoms of PTSD, prevalence of suicide ideation increased by 13% with every 10-unit increase in the percentage of hours worked on afternoon shift.

Organizational structure may have an impact on police suicide rates. Smaller police departments, for example, had a significantly higher suicide rate than large departments: 43.78/100,000 - smallest, 13.67/100,000 -small, 26.39/100,000-medium, and 12.46/100,000 - largest ($p < 0.0001$) (Violanti, Hartley, Manatsaknova, Andrew, & Burchfiel, 2012). Departments that were smallest had significantly higher suicide rates than those classified as small ($p = 0.028$) and large ($p < 0.0001$). Possible reasons include lack of availability for mental health assistance, increased workload and danger, and community visibility (Violanti, et al, 2012)

Despite this previous research, there is presently little national level research on suicide risk in law enforcement occupations. Research is primarily based on specific geographic areas and generally does not consider race, gender and type of law enforcement duties. The present study examines patterns of suicide during 1999, 2003-2004, 2007 based on a national database- the NOMS system, maintained by the Center for Disease Control and Prevention's National Institute for Occupational Safety and Health (CDC/NIOSH) that contains cause of death data for workers by occupation and industry. Utilizing these recent data, we focused on law enforcement personnel demographics for two specific occupational categories: detectives/criminal investigators/police and corrections officers. We evaluated the association between detectives/criminal investigators/police and corrections officers to determine whether suicide risk was elevated as suggested in the literature.

METHODS

We analyzed occupation- and industry-coded death certificate data from 23 reporting U.S. States for the years 1999, 2003-2004, and 2007. U.S. death certificates contain information on the usual occupation of the decedent that is provided by the survivors, where usual occupation is defined as the longest or lifetime occupation. The data were contributed by US states to the NOMS System maintained by NIOSH (NOMS 2012). (PMRs, charts, and methods are available at <http://www.cdc.gov/niosh/topics/surveillance/NOMS/>. Last accessed October 28, 2013).

The reporting states were Colorado, Georgia, Idaho, Hawaii, Indiana, Kansas, Kentucky, Michigan, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Rhode Island, South Carolina, Texas, Utah, Vermont, Washington, West Virginia, and Wisconsin.

Death certificate data for 1.46 million decedents, age 18-90 who died in one of the 23 States were the source of study data. The underlying causes of death were coded and edited by State nosologists according to the International Classification of Diseases, Tenth Revision (ICD-10; World Health Organization, 1992). The demographic data were coded and edited by CDC's National Center for Health Statistics (NCHS).

For purposes of analysis, industry and occupation variables require standardized coding for use in mortality studies. The narrative text entered on the death certificate for usual occupation and industry has been coded by state health departments and/or NIOSH using the Census classification system (US Census 1992, 1998, 2003) either manually or using an internet-based coding program (NIOSH Industry and Occupation Computerized Coding System [NIOCCS]; <http://www.cdc.gov/niosh/topics/coding/>). Quality control of occupation and industry coding was performed at NIOSH by trained coders and the coding specialist. The overall error rate range for the states that coded industry and occupation for 1999, 2003-2004, 2007 was 5-10%.

Identification of Deaths

Data for all deaths with coded occupation and industry on 1,462,406 death certificates (660,320 Caucasian men, 617,119 Caucasian women; 75,998 African-American men; 67,990 African-American women) were provided to NIOSH by the States and NCHS. After edits of the data and elimination of the unemployed or those with no reported occupation or industry, all deaths aged 18-90 years due to suicide (intentional self-harm, ICD-10 codes X60-X-84, Y870) were identified from the study population and used to create analysis files that include age, sex, race, ethnicity, underlying cause of death, and usual occupation and industry. Law enforcement occupations of interest were specified as detectives, criminal investigators and police (2000 Census codes 382; 1990 Census code 418); and, bailiffs, correctional officers, jailors and supervisors (2000 Census codes 370,380 and 1990 Census codes 415,424). In the manuscript, these titles are herein referred to as detectives/criminal investigators/police and corrections officers. The law enforcement category contained detectives, criminal investigators, police and sheriff's patrol officers (including supervisors), fish, game, and parking enforcement, and bailiffs, correctional officers (2000 Census codes 371, 380-385; 1990 Census

codes 414, 418-424). Fish, game and parking enforcement officers were not of interest and were not reported separately. The comparison population was deaths in all occupations.

National death data are reported by NCHS by age, race, gender, Hispanic origin (ethnicity), cause of death and other variables. Of the decedents, 39,184 men and 28,108 women were of Hispanic ethnicity. NCHS uses race and ethnic categories consistent with the changes to the 1977 Office of Management and Budget Standards (U.S. OMB, 1997). Because Hispanic decedents may also indicate race, there may be overlap of ethnicity and race. We chose to report totals for Caucasian and African-American populations and for Hispanic ethnicity separately. Hispanic ethnicity category overlaps the Caucasian and African-American race categories. Totals always refer to the total number of Caucasian and African-Americans. Hispanic is the largest ethnic group; the number of deaths for other ethnic groups was insufficient for analysis.

Proportionate Mortality Ratio Analysis (PMR)

Proportionate mortality ratio analysis based on the underlying cause of death was used to evaluate the suicide patterns by occupation and industry. Race-, sex- and ethnicity-specific age-adjusted PMRs were calculated for Caucasian, African-American, and Hispanic men and women using a computer program developed at NIOSH (Dubrow et al., 1987). This program was designed to calculate PMRs for occupation or industry specifically for population-based data. It calculates PMRs by comparing the proportion of deaths from a specified cause within a specified occupation or industry group with the proportion of deaths due to that cause among the comparison population, and age-adjusts after stratification on race (Caucasian and African-American) and ethnicity (Hispanic). A PMR above 100 is considered elevated over the average for all occupations. Ninety-five percent confidence intervals (95% CI) for the observed PMRs were calculated. If the observed number of deaths was 1000 or less, the 95% CI was computed based on the Poisson distribution (Bailar & Ederer, 1964); otherwise, test-based CIs were calculated using the Mantel and Haenszel χ^2 test (Mantel & Haenszel, 1959). Statistical significance ($p < 0.05$ for a two-sided test) and 95% CIs should be evaluated in the context of hypothesis generation because multiple comparisons were made (Rothman, 1986). Due to confidentiality agreements with states, the number of deaths was reported in the tables as '<5', when a cell is based on less than 5 deaths.

PMRs are usually computed when data for the population at risk are not available and rates of death or standardized mortality ratios (SMR) cannot be calculated. Our study includes only deaths; however, the population at risk for this study includes all men and women ages 18-90 who were at risk of dying at any time between January 1 through December 31, 1999; January 1, 2003 through December 31, 2004, and January 1 through December 31, 2007. PMRs indicate whether the proportion of deaths due to a specific cause appears to be high or low for a particular occupation and estimate the death rate. The unemployed, part-time workers and those in unknown occupations or industries (approximately 3%) were excluded from the analysis.

RESULTS

Table 1 displays PMRs for the total number of law enforcement suicides and suicides listed by race and gender for the years 1999, 2003-2004, and 2007. Regarding total suicides, there were 264 suicide deaths among all law enforcement workers, resulting in a significantly higher PMR for suicide than expected (PMR=169, sig. $p < 0.01$, 95% CI=150-191). The PMR represents a 69% higher risk for suicide among law enforcement workers compared to all decedents in the study population who were employed during their lifetime.

Table 1. Proportionate Mortality Ratios (PMRs)*** for Suicide: Type of Law Enforcement by Race and Sex, Ages 18-90, vs. U.S. Working Population. CDC/NIOSH National Occupational Mortality Surveillance, 1999, 2003-2004, 2007.									
<u>TYPE OF LAW ENFORCEMENT</u>	TOTAL SUICIDES								
	<u>Deaths</u>			<u>PMR</u>			<u>95% CI ****</u>		
All law enforcement workers	264			169**			150-191		
Detectives/criminal investigators/police	115			182**			150-218		
Correction officers	73			141**			111-178		
SUICIDES- RACE AND SEX: MALES									
	Caucasian Males			African-American Males			Hispanic Males		
	<u>Deaths</u>	<u>PMR</u>	<u>95% CI</u>	<u>Deaths</u>	<u>PMR</u>	<u>95% CI</u>	<u>Deaths</u>	<u>PMR</u>	<u>95% CI</u>
All law enforcement workers	226	134**	117-153	11	157	78-281	19	244**	147-380
Detectives/criminal investigators/police	98	133**	108-162	8	288*	124-568	8	388**	168-765
Correction officers	59	134*	102-173	<5	85	18-249	<5	99	20-289
SUICIDES-RACE AND SEX: FEMALES #									
	Caucasian Females			African- American Females					
	<u>Deaths</u>	<u>PMR</u>	<u>95% CI</u>	<u>Deaths</u>	<u>PMR</u>	<u>95% CI</u>			
All law enforcement workers	14	164	90-275	<5	188	5-1050			
Detectives/criminal investigators/police	<5	96	12-347	<5	744	19-4145			
Correction officers	9	199	91-377	<5	3932	98-21908			

Deaths=22,831

ICD (10) codes x60-X64, Y870.

sig.* $p < 0.05$ sig.** $p < 0.01$

***A PMR above 100 is considered elevated over the average for all occupations.

**** 95% Confidence Intervals.

-Data on Hispanic female police suicide not available

115 deaths due to suicide were recorded for detectives/criminal investigators/police in the total category; and this resulted in a significantly higher PMR than expected (PMR=182, $p<0.01$, 95% CI=150-218). The PMR for detectives represents an 82% higher risk compared to the general working population and is higher than other law enforcement workers. Corrections officer suicide was also at significantly higher than expected risk for suicide with 73 suicides recorded (PMR=141, $p<0.01$, 95% CI=111-178). This represents a 41% significantly higher risk for corrections officers compared to the general population. Although significantly high, corrections suicides were at somewhat lower risk than other law enforcement workers.

Proportionate mortality among law enforcement officers for suicide was examined by race and gender. Among Caucasian males, 226 deaths were recorded in the law enforcement worker category, representing a significantly higher risk for suicide than expected for this population (PMR=134, $p<0.01$, 95% CI=117-153). Similar PMR's were noted for Caucasian male detectives/criminal investigators/police and corrections officers, these categories all being at significantly higher risk for suicide (Table 1). Eleven suicide deaths were recorded for African-American males (PMR=157, 95% CI=78-281) but were not significantly high for this population. African-American male detectives/criminal investigators/police did have an increased risk for suicide (PMR=288, $p<0.05$, 95% CI=124-568), however, there were a small number of deaths in this category ($n=8$). Deaths for corrections officers numbered less than five.

Fourteen suicides occurred among Caucasian females in the law enforcement worker category, with nine recorded in the corrections officer category. Caucasian female detective suicides numbered less than five and could not be listed. PMRs for all three Caucasian female law enforcement categories were not significantly higher than expected. Suicides among African-American females numbered less than five in all three types of law enforcement.

A significantly high (19 suicides, PMR=244, $p<0.01$, 95% CI=147-380) ratio was found among Hispanic Males in the law enforcement category, and similarly among Hispanic detectives/criminal investigators/police (8 suicides, PMR=388, $p<0.01$, 95% CI=168-765). Less than five suicides were noted among Hispanic corrections and were not reported for confidentiality reasons. Data were not available for Hispanic females.

DISCUSSION

The present study examined updated information on law enforcement suicide risk utilizing the NOMS database. Overall, PMRs were significantly high for all races and sexes combined, across the all law enforcement category; and the two sub groups--detectives/criminal investigators/police; and corrections officers. Detectives/criminal investigators/police had the highest suicide risk.

In the all law enforcement worker category, Caucasian male officers had the highest number of suicide deaths (226 deaths) compared to African-American and Hispanic male officers (11 and 19 deaths respectively). PMRs for Caucasian males were significantly high across the all law enforcement and detective and corrections officer categories. Caucasian males represent the majority of workers in U.S. law enforcement. Significantly high PMRs were found among Hispanic Males in the all law enforcement category, and among Hispanic detectives/criminal investigators/police. Across all three job categories, a total of fourteen suicides were recorded among Caucasian female officers; none were significantly elevated (Table 1). There were small numbers of deaths (less than five) among African American females.

African-American officers had lower numbers of and proportionate mortality for suicide than Caucasian officers in the present study. This result is in agreement with national suicide data for 2010, where the rates were lower for African-Americans (22.3 vs.6.8 /100,000) (MMWR, 2013). African-American women in the United States had an even lower suicide rate (2.7/100,000) (MMWR, 2013). This was an interesting result, since previous research suggests that African American and women police officers may be at higher risk for stress and related depression (Dowler, 2005; Haar & Morash, 1999). Dowler (2005) reported that African American officers are more likely to feel criticized and to believe that they are perceived as militant. A sense of isolation is reported among minority officers that may exacerbate burnout and depression (Polk, 1995).

Female officers had elevated (not statistically significant) PMRs for suicide in the present study. Nationally, the suicide rate for women in the U.S. was considerably lower than men (8.1 vs. 27.3/ 100,000 respectively; MMWR, 2013). That suicide for females is lower than males is an interesting finding, as women officers are generally subjected to additional stressors in male dominated law enforcement work. Female

police officers are likely to encounter higher levels of harassment, overt hostility, and other negative social interactions on the job (Martin, 2004). A possible explanation for lower suicide risk for minority and female suicides was put forth by He, Zhao, and Ren (2005), who found that dynamic factors such as work environment and coping mechanisms contributed more in explaining police stress than static factors such as race and gender. These authors comment that more research is needed to further explore the relationship between race, gender, police organizational culture, and the occupational stress of police officers.

Significantly high proportionate mortality was found among Hispanic Males in the law enforcement category, and among Hispanic detectives/criminal investigators/police. Very little research is available regarding suicide among Hispanic officers. On a national level, there was an approximate 2% increase in Hispanic male and a 9.6% among Hispanic female suicides from 1999-2010 (MMWR, 2013).

Overall, detectives/criminal investigators/police had the highest suicide ratio in the present study. Work exposure for detectives/criminal investigators is somewhat unique from police or patrol officers; however these occupations could not be analyzed separately given the 1990/2000 Census occupational classifications (US Census 1992, 2003).

The risk for corrections officer suicide was significantly high (PMR=141, $p<0.01$), although somewhat lower than law enforcement workers and detectives. In an analysis of corrections suicide in 21 states, Stack (1997) found that corrections officers had a 39% higher risk for suicide than the rest of the working age population. Cheek and Miller (1983) found that the average rates of divorce and stress related illnesses (i.e., heart disease, hypertension, and ulcers) for corrections officers were high, while another study reported that the average life span of corrections officers was sixteen years lower than the national average (Cheek, 1984). According to Dowden (2004), of all the problems facing corrections officers (e.g. long work hours, inmate characteristics, administrative stress), the perceived dangerousness of the position was the most important.

Advantages and Limitations

Limitations in the PMR method may bias risk estimates toward the null. Another bias could arise because a PMR can be affected by disproportionate increased or decreased mortality from other causes of death. For example, very

high PMRs due to large causes of death such as heart disease or injury can lower cancer PMRs. (McDowall 1983.) More recent studies suggest that PMR analysis, when used for population-based studies of workers, may be less biased than SMR analysis. This is because comparison with other workers limits the impact of the healthy worker effect—i.e., all causes mortality in workers is low during the working years compared to the general population due to selection processes in employment (Park et al., 1991; Checkoway et al., 2004). Misclassification may be a source of bias due to inaccurate reporting of usual occupation and industry, the underlying cause of death, and the lack of data on occupational exposures. Usual occupation and industry on death certificates are identified by informants, not the deceased worker, and could have been inaccurate in some cases, resulting in some misclassification. Four case-control studies of long-term Caucasian workers across all occupations (Peterson and Milham, 1974; Wegman and Peterson, 1978; Steenland and Beaumont, 1984; Milham, 1997) have reported 75-80% agreement between occupations as listed on the death certificate and those determined by interviewing next-of-kin.

Law enforcement suicide data may be further biased by possible misclassification of suicides, resulting in lowered rates (Phillips & Ruth, 1993; Aldridge & St. John, 1991; O'Carroll, 1989; Pescosolido & Mendelsohn, 1986). How many deaths that were categorized as being of unknown or accidental causes that were actually suicides cannot be determined without conducting comprehensive and detailed psychological autopsies. A previous study found that approximately 17% of police suicides are misclassified as undetermined deaths (Violanti, Vena, & Marshall, 1996). Violanti (2010) reported that Caucasian male police officer deaths had an increased risk of being misclassified as undetermined (PMR = 117, 95% CI=110-123, $p<0.01$). A high risk of misclassification was also seen in female and African American officer deaths (PMR=198, 95% CI=151-255, $p<0.01$ and PMR=344, 95% CI=178-601, $p<0.01$ respectively).

Although usual occupation and industry listed on the death certificate are reasonably accurate for the usual or longest occupation, they do not provide a complete description of occupational exposure for the workers. The impact of many job changes on the risk of suicide by occupation or industry, although not assessed, may obscure some associations. In general however those who choose a career in law enforcement tend to stay until retirement (Violanti, 1992)

Conclusion

In summary, the present study found significantly higher proportionate mortality for suicide among detectives/criminal investigators/police when compared to suicides in the US working population in the NOMS database for the years 1999, 2003-2004 and 2007. However, the death data in the NOMS database did not contain sufficient detail to identify etiologic factors leading to the reported suicides. Work exposures that may be responsible for the observed elevated proportionate mortality in these occupational categories should be considered in further research. For example, incidents such as witnessing death, encountering abused children, and violent street combat weigh heavily as precipitants to depression, alcohol use, and suicide (Violanti 2012). Future research should include etiologic studies that can evaluate potential occupational factors and precipitants that lead to increased risks. This can inform preventive actions to reduce the risk of suicide in law enforcement occupations.

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