A Systematic Review of Risk Factors Implicated in the Suicide of Police Officers

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Abstract

Suicide has long been considered as nearing 'epidemic levels' in law enforcement populations. Nevertheless, despite the argued scale of the problem, no review has yet systematically examined the evidence base to elucidate the risk factors or predictors implicated in the suicidal behaviours of police officers. The current review aims to do this, by considering a final sample of 20 papers that met inclusion criteria. Findings from this qualitative review revealed five superordinate risk factors (i.e., problematic substance use close to, or at the time of death; presence of depression and previous suicide attempts; differences in trauma response; exposure to excessive and prolonged job-related stress, including dissatisfaction; absence of a stable intimate relationship), which when taken in isolation each incrementally contributed to suicide risk, but when found to be comorbid, appeared to markedly increase the likelihood of completed suicide. Implications for suicide prevention, policy design, and treatment formulation are discussed, along with limitations and directions for future research.

Keywords Police · Uniformed services · Suicide · Risk factors · Post-traumatic stress disorder · Suicidal ideation

Introduction

Mental health problems play a significant role in the non-communicable disease burden estimated to affect approximately 300 million people worldwide (Institute for Health Metrics and Evaluation 2017). Of this broader class of 'mental health problems', suicidal behaviours and/or ideation pose a considerable concern for general populations (Di Nota et al. 2020), with more than 700,000 deaths attributed to completed suicide annually (WHO Report 2021). Despite the scale of this issue, in small communities and closed occupational groups (e.g. law enforcement, emergency care workers, medical practitioners, etc.), the immediate and long-term impacts of suicide are arguably exacerbated given the depressive 'ripple' effect that may eventuate as a product of witnessing first-hand trauma (Barron 2010).

Much has been theorised and written about the incidence and prevalence of suicide in law enforcement over the past five decades (Violanti et al. 1998). Data from the most recent Office for National Statistics (UK) bulletin on *suicides by occupation* show that there has been a total of 169 serving police officers who have committed suicide between 2011 and 2019, with this averaging to approximately 21 deaths per year in the UK (ONS 2019). Given that elevated prevalence estimates as compared to normal populations have been consistently observed across time periods and jurisdictions (Violanti 1995a, b), some researchers have described suicide in law enforcement populations as an 'epidemic' (Loo 2001).

Despite these strong assertions, other authors have cast doubt over suicide classification as the leading cause of death among law enforcement officers (Chopko et al. 2014). Methodological problems in the assessment and collection of suicide statistics, including inadequate sample sizes, limited measurements of specific police populations, regional variations, and inconsistent reporting periods, make accurate estimation of the true problem increasingly difficult (Barron 2010; Chopko et al. 2014). Irrespective of whether police officers experience higher rates of suicide compared to the general population (Violanti 1995a, b), police agencies are typically drawn from populations where mental and physical illness are minimal (i.e., psychological and medically tested), officers are employed and engaged in meaningful occupational work, and afforded adequate support via

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training, health benefits, and counselling (Barron 2010). It therefore stands that rates equivalent to the general population mortality figure, which considers both the young and old, those with mental and physical illnesses, or who are unemployed, uneducated, or from lower socio-economic backgrounds (Barron 2010; Violanti 2001), warrants significant concern.

Consequently, researchers have shifted away from quantifying rates of suicide in favour of investigating the risk factors and predictors that underpin suicide in this occupational group (Barron 2010; Berg et al. 2003). While general expert consensus holds that suicide causation is multidimensional (Barron 2010), the literature reports three particular classes or levels of stressors thought to be implicated in the completed suicide of law enforcement personnel: (1) personal or individual stressors, (2) occupational factors, and (3) organisational issues (Hart et al. 1995). Personal or individual stressors refer to factors internal to the police officer such as mental or substance use disorders (i.e., depression; Kessler et al. 1999), suicidal ideation (Nugent and Williams 2001), relationship and financial problems (Barron 2010), and susceptibility to post-traumatic stress/disorder(s) (Carlier et al. 2000). Occupational factors encompass those demands considered to be 'part of the job' such as completing shift work, engaging with victims and perpetrators of crime, and interacting with the justice system (Hart et al. 1995). Organisational issues comprise concerns around reduced support, bureaucratic red tape, and lack of career advancement opportunities (Barron 2010). These classes of stressors upon reaching a critical mass are thought to decrease an officer's suicidal threshold, thereby increasing the likelihood of suicidal behaviour (Barron 2010).

More recently, Di Nota et al. (2020), in an effort to move beyond the classification of stressors towards a psychological model that delineates the causal pathways implicated in police suicidal behaviours, argue that increased suicidal risk may be partially explained by both the *Interpersonal-Psychological Theory of Suicide* (Joiner 2005) and Klonsky and May's (2015) *Three-Step Theory*. Incorporating this, Di Nota et al. (2020) asserts that progressive suicidal behaviours develop via a tripartite process: (1) suicidal ideation emerges from feelings of pain (e.g. psychological or physical) and hopelessness often triggered by exposure to potentially psychologically traumatic events, (2) the presence of pain and hopelessness coupled with low or absent connectedness exacerbates suicidal ideation leading to suicide planning, and (3) suicide attempt/s are carried out where the officer possesses the necessary dispositional or genetic features, has become habituated to pain, injury fear, and/or death, and has knowledge and access to lethal means. In short, suicidal behaviours are likely to occur where a police officer with suicidal ideation has the impetus and capacity to enact a plan (Di Nota et al. 2020), and therefore fitting with the aforenoted theories.

Given the lack of published systematic reviews concerning why police officers commit suicide, it was deemed timely to undertake a systematic assessment of the existing evidence base. Accordingly, this review aimed to provide a structured examination of the available literature concerning the following research question: What is empirically known regarding why police officers commit suicide? The aims of this systematic review were as follows: (1) to identify potential risk factors (i.e., precipitating factors, motives, and triggers) that influence suicide in police officers; (2) to identify any sex differences in the mode, methodology, or risk factors underpinning suicide in police officers; (3) to identify any differences in risk factors for suicide between sworn and unsworn police officers; and (4) to review any police suicide risk factor differences between developed and underdeveloped jurisdictions.

Method

Following PRISMA guidelines, publications that empirically examined risk factors contributing to suicide in police officers were identified (Moher et al. 2009). Four English language databases were considered: PsycInfo, PsycNet, PubMed, and Web of Science. Search terms were grounded in previous research and selected using the SPIDER search strategy protocol (Cooke et al. 2012). Consistent with the SPIDER protocol, the following was achieved: (1) identification of the relevant sample, phenomenon of interest, design, evaluation, and research type; (2) key terms highlighted; and (3) alternative phrases generated, to develop a coherent search strategy. The research team then reviewed the appropriateness of the search strategy and identified potential further terms. Final search terms included officer*, suicide, and factor*. Additional articles were obtained via manual searching of relevant publications and reference lists.

Inclusion and Exclusion Criteria

The SPIDER search strategy protocol was used to identify inclusion and exclusion criteria (Table 1). Studies were considered eligible if they (a) reported information concerning risk factors for completed suicide solely in civilian police officers, (b) presented findings derived from any empirical research method, and (c) were available in English. Time limits were placed on searches to allow a contemporary landscape of issues to be canvassed (e.g. January 1990 – present; Violanti et al. 2004).

Studies were excluded if they (a) did not report any information regarding risk factors for completed suicide in civilian police officers, (b) studied the defined outcome (i.e., completed suicide) in non-civilian police samples (e.g. military law enforcement) or in mixed samples (e.g. civilian

Table 1 Study search strategy organised using the SPIDER framework

SPIDER elements	Keyword(s)	Search terms and strategies
Sample	Law enforcement officers	Law enforcement **OR** Officer* **OR** Police **OR** Police Officer **OR** Police Force **OR** Policemen **OR** Police-women **OR** Detective **OR** Investigator **OR** Agent **OR** Constable **OR** Cop **NOT** Emergency*
Phenomenon of interest	Suicide	Suicide **OR** Self-destruct* **OR** Self-murder **OR** Self-slaughter **OR** Self-immolation
	Precipitating factors	Factor* **OR** Influence* **OR** Motive* **OR** Purpose **OR** Cause **OR** Function **OR** Intent **OR** Objective **OR** Reason **OR** Risk Factors **OR** Contributing Factors **OR** Predisposing Factors **OR** Protective Factors **OR** Stress* **OR** Trigger*
Design	Any study design **NOT** editorials **NOT** narrative reviews **NOT** book chapters **NOT** commentaries **NOT** opinion papers	
Evaluation	Nil	
Research	Nil	

Asterisk denotes any further letters following the search term. Each grouping of search terms is joined by the Boolean operator **AND**

police officers and firefighters), (c) did not contain primary data, (d) did not satisfy an empirical research methodology (i.e., conference paper, editorial, book chapter), and (e) were not available in English.

Eligibility Screening

Titles and abstracts were screened to determine if they met the inclusion criteria. If it was not possible to determine a paper's eligibility at this stage, it remained on the list and was examined during the full-text stage. To minimise the risk of bias during the eligibility screening stage, a random sample ($n = 12$) of articles examined for eligibility at the full-text stage were selected for quality assessment by a member outside of the research group. Agreement between the research group and external member, calculated using Cohen's kappa, was 1.00 ($p < 0.05$), which is considered very good.

Quality Assessment

Two quality assessment tools were selected to appraise the quantitative and qualitative studies included within this review: (1) The JBI Checklist for Analytical Cross-Sectional Studies (i.e., quantitative; Moola et al. 2020), which consists of eight questions designed to probe various quantitative methodological aspects (e.g. sample clearly defined, outcomes validly measured, appropriate statistical analyses), with each question rated as 'yes', 'no', 'unclear', or 'not applicable', and item ratings used to guide the assessor's judgement regarding article inclusion or exclusion, and (2) The Critical Appraisal Skills Programme (CASP) qualitative checklist (QC), to appraise all qualitative studies that met the inclusion criteria (Critical Appraisal Skills

Programme 2018). The tool consists of 10 questions that tap various methodological aspects (aims, methodology, research design, recruitment strategy, data collection, research-participant relationships, ethical issues, data analysis, findings and meaningful), which are given a rating of 'yes', 'can't tell', or 'no'. For the purposes of this review, item ratings for both the CASP and JBI were used to guide the assessor's judgement regarding article inclusion or exclusion, and overall risk of bias.

To minimise the risk of bias during the quality appraisal process, a random sample ($n = 5$ [10%]) of the included studies were selected for quality assessment by a member outside of the research group. Agreement using Cohen's kappa was 1.00 ($p < 0.05$) and thus very good.

Data Extraction and Analysis

A data extraction table was designed to collate information relevant to aims (1) to (4) of the systematic review. This included extracting data regarding sample descriptors (i.e., sample size, country, setting, officer rank), sex differences, differences between sworn and unsworn police officers, methodological study type and design, key findings, and main conclusions drawn.

Thematic analysis was used to examine aims (1) to (4). Using Braun and Clarke's (2006) six-step guide to thematic analysis, once familiar with each article, information was organised into codes based on features within the data. This allowed for a deeper understanding of the information and identification of initial patterns in relation to the research aims. Themes were then generated based on commonalities and patterns among the codes. Proposed themes were reviewed in relation to the data and refined, and then named based on their content. Care was taken to ensure that themes

were not overly complex and presented an internally consistent narrative that accurately represented the data.

Results

Search Results

In total, 19,004 articles were identified, with manual searching identifying a further eight records. After duplicates were removed, 16,680 articles remained. The specific process of screening and retrieval is indicated in Fig. 1. The final sample included 20 articles, which were examined using the quality assessment tools. No papers were excluded after the quality appraisal stage.

Characteristics of the Included Studies

The majority of studies were conducted in Africa (9), in urban precincts (30%), using a cross-sectional study design (90%; see Table 2 for further information regarding study demographics). The 20 studies included 12,603 participants, with 9476 men and 3042 women, and 85 sex not specified. Of the studies that reported age parameters, participant's age ranged between 18 and 69, with a mean age of 36.45(SD = 3.48). Studies mostly examined risk factors in sworn junior (i.e. corporal, constable, patrol duty; 6031 officers) police officer populations (55%). All 20 articles were considered low risk of bias (see Table 2 for paper demographic and Table 3 for papers included and quality assessment).

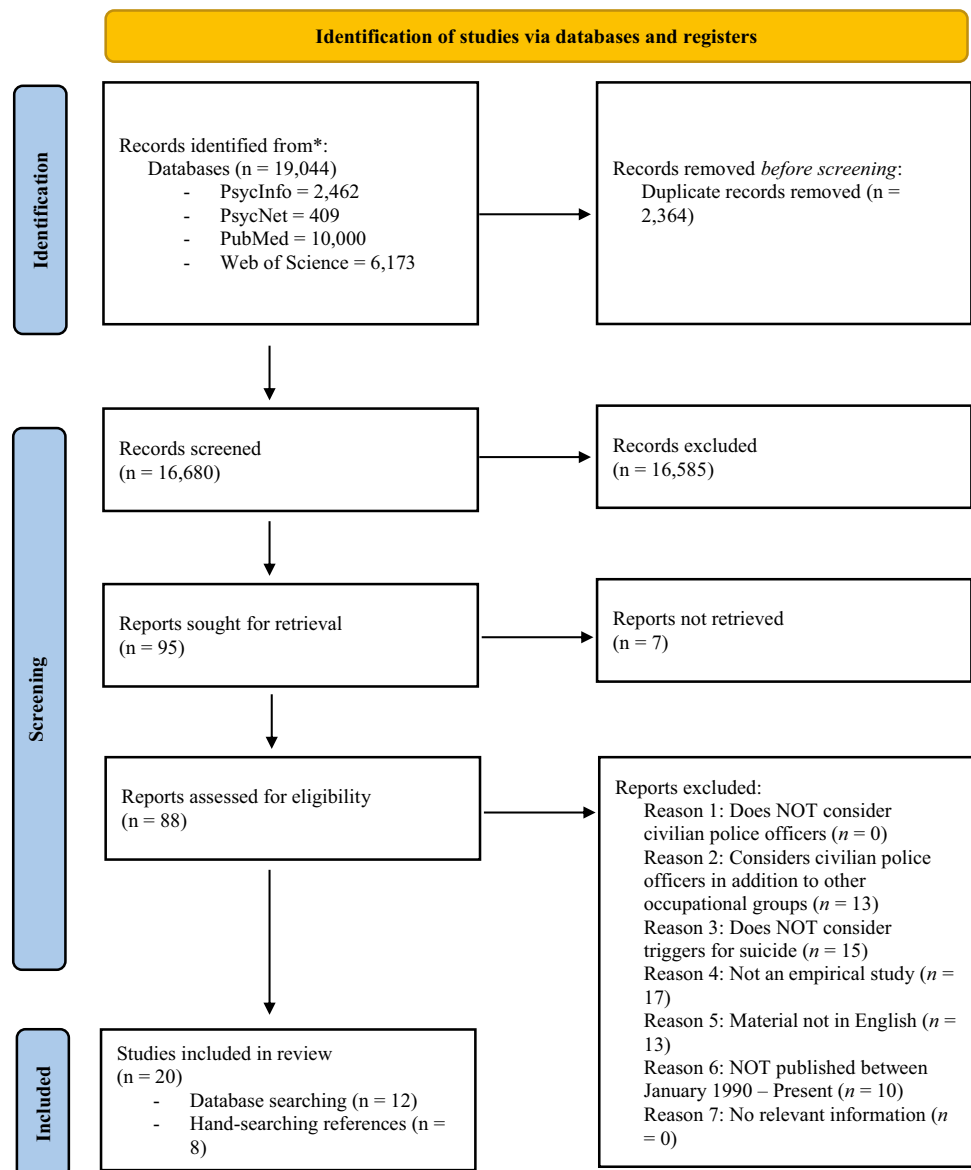**Fig. 1** Flowchart depicting the systematic review process

Table 2 Study demographical details

	Country	Sample size	Mean age (years)	Setting (urban or rural)	Sworn and/or unsworn	Office rank	Years of service	Marital status
Barron (2010)	Australia	41	35					
Beehr et al. (1995)	USA	177	32.1	Urban	Sworn	Officer = 161 Sergeant = 14 Other = 2	7.9 (Average)	
Berg et al. (2003)	Norway	3272	38.9		Sworn and unsworn	Officer = 2128 Middle manager = 1034 Manager = 96		Single = 342 Married = 2715 Divorced = 164 Widowed = 11
Burke and Mikkelsen (2007)	Norway	766		Urban and rural	Sworn and unsworn	Constable = 451 Manager = 20 Supervisor = 252		Single = 134 Married = 631
Chopko et al. (2014)	USA	193	41.6	Urban and rural	Sworn and unsworn	Patrol duty = 141 Administration = 8 Detective/ investigator = 39 Other = 5	1 to 42 (Range)	Single = 18 Married = 148 Divorced = 13 Committed = 11
Di Nota et al. (2020)	Canada	4236		Urban and rural	Sworn and unsworn	RCMP = 1936 Other police = 1974 Civilians = 326		Single = 144 Married = 1308 Divorced = 167 Remarried = 72
Meyer et al. (2003)	South Africa	307	34.92		Sworn	Captain = 170 Sergeants = 57		Single = 61 Married = 150 Separated = 20
Nijiro et al. (2021)	Tanzania	497	41	Urban	Sworn	Gazette officer = 22 Rank and file = 412 Inspector = 60	5 to 15 + (Range)	Single = 92 Married = 371 Separated = 20
Pienaar and Rothman (2005), Pienaar et al. (2007)	South Africa	1794	34.53		Sworn	Constable = 122 Sergeant = 369 Inspector = 909 Captain = 394		Single = 646 Married = 787 Divorced = 322 Separated = 26 Remarried = 13
Quarshie et al. (2021)	Ghana	268	34	Urban	Sworn	Constable = 252 Senior officer = 16		Single = 61 Married = 157 Other = 46
Rothmann and Strijdom (2002)	South Africa	120		Urban and rural	Sworn	Constables = 6 Sergeants = 77 Inspectors = 37	3 to 15 (Range)	Single = 40 Married = 80
Rothmann and van Rensburg (2002)	South Africa	287	32.79	Urban and rural	Sworn	Constables = 75 Sergeants = 93 Inspectors = 111		
Rouse et al. (2015)	USA	8	33	Urban	Sworn		4 to 7 (Range)	
Steyn (2012), Steyn et al. (2013)	South Africa	217	40	Rural	Sworn			
Violanti (2004), Volanti et al. (2008), (2009)	USA	115	39.5	Urban	Sworn	Officer = 73 Sergeant = 15 Captain/detective = 22	13.16 (Mean)	Married = 73 Other = 42

	Country	Sample size	Mean age (years)	Setting (urban or rural)	Sworn and/or unsworn	Office rank	Years of service	Marital status
Wray and Jarrett (2019)	Jamaica	305		Urban	Sworn	Constable = 193 Corporal = 59 Sergeant = 53	1 to 39 (Range)	Single = 125 Other = 180

Research aim 1: to identify any risk factors (i.e., precipitating factors, motives, and/or triggers) that influence suicide in police officers.

Five superordinate themes were identified via thematic analysis, as follows:

Theme 1: problematic substance use close to, or at the time of death (40%; eight articles).

Consensus emerged that substance misuse was related to both suicidal ideation and completed suicide (Di Nota et al. 2020; Meyer et al. 2003; Violanti 2004). In their psychological autopsies, Barron (2010) and Rouse et al. (2015) found that problematic drinking was prevalent for police officers who died by suicide. Police officers were often under the influence of alcohol or other substances close to, or at the time of death, with officers having increased their alcohol intake prior to suicide. Problematic drinking behaviour was also related to coping mechanisms, with rugged individualism considered as stereotypical for police officers, which increased problematic drinking behaviour (Beehr et al. 1995). The more alcohol that was consumed per week, the higher the risk of suicidal ideation, with officers consuming higher levels of alcohol less able to cope and seek support (Pienaar and Rothmann 2005; Rothmann and van Rensburg 2002).

Theme 2: presence of depression and previous suicide attempts (35%; nine articles).

Being diagnosed with, or having traits of depression, was considered a common risk factor for being a vulnerable police officer with an increased risk of suicidal ideation (Berg et al. 2003; Chopko et al. 2014; Di Nota et al. 2020). Further, Violanti et al. (2009) suggested that there was a slightly higher incidence of suicidal ideation in women officers, as they reported more depressive symptoms than men. In the psychological autopsy, Barron (2010) found that 40% of the officers who completed suicide used antidepressants or other psychotropic medication, and 31.5% were diagnosed with depression. Many of these officers had communicated their suicidal intent to others. In addition, Njiro et al. (2021) reported that depression and low support were intertwined in predicting suicidal ideation. A small number of police officers had a history of previous suicide attempts, with this more prevalent for women (Berg et al. 2003; Di Nota et al. 2020). Officers who had attempted suicide previously scored higher on current suicidal ideation (Meyer et al. 2003; Pienaar and Rothmann 2005). Further, officers who completed suicide had a history of multiple suicide attempts (Rouse et al. 2015).

Theme 3: differences in trauma response (35%; seven articles).

There appeared consensus that post-traumatic stress disorder (PTSD) influenced both suicidal ideation and completed suicide in police officers (Rouse et al. 2015; Steyn 2012; Steyn et al. 2013; Violanti 2004). Violanti (2004, p. 281) found that trauma resultant from "person's dying" or the "homicide of fellow officers" in conjunction with increased substance use "elevated the odds of suicidal ideation approximately ten times over those officers who had lower levels of trauma". More particularly, the included studies found that clusters of PTSD symptom criteria (i.e., hyperarousal, intrusive memories, etc.) predicted suicidal ideation differentially in men and women (Steyn 2012; Steyn et al. 2013). In two linked studies, Steyn (2012) and Steyn et al. (2013) found that for women police officers, "intrusive memories and to a lesser extent level of impairment influenced suicidal ideation" (Steyn 2012, p. 237), while among the men in the experimental group, hyperarousal was found to be "a key predictor of suicidal ideation" (Steyn 2012, p. 237). These divergent findings were theorised by the researchers as resulting from a women officers tending to ruminate more (Steyn 2012, p. 237), whereas for men problems focus on impulse control and the regulation of affect (Steyn 2012, p. 237).

Theme 4: exposure to excessive and prolonged job-related stress, including dissatisfaction (45%; nine articles).

Occupational stress refers to stressors faced in the course of police officers' duties, and which directly influences suicidal ideation and completed suicide. There was consensus that occupational stress was a product of *burnout* (subordinate theme 1) and *job dissatisfaction* (subordinate theme 2).

Subordinate theme 1 – burnout. Burnout refers to a state of emotional, physical, and mental exhaustion caused by excessive and prolonged job-related stress. Both Berg et al. (2003) and Burke and Mikkelsen (2007) found that burnout components of "emotional exhaustion and depersonalisation (or cynicism) predicted suicidal ideation" via increases in both depression and anxiety (Berg et al. 2003, p. 310). Using the Maslach Burnout Inventory – Human Service Survey (MBI-HSS; Maslach et al. 1996), Wray and Jarrett's (2019,

Table 3 A summary of studies included in the systematic review

Author(s)	Country	Research design	Setting	Participants	Key findings	Quality assessment tool and rating
Barron (2010)	Australia	Psychological autopsy	N/A	41	Developed a police officer risk factor profile: problematic drinking and prescription drug use, recent history of mental illness, relationship breakdown within the previous 12 months and male	JBI I low
Beehr et al. (1995)	USA	Cross-sectional	Urban	177	Problematic drinking behaviour was related to coping mechanisms, with rugged individualism coping being considered stereotypical	JBI I low
Berg et al. (2003)	Norway	Cross-sectional	N/A	3272	Burnout components of emotional exhaustion and depersonalisation predicted suicidal ideation via increases in both depression and anxiety	JBI I low
Burke and Mikkelsen (2007)	Norway	Cross-sectional	Urban and rural	766	Burnout components of emotional exhaustion and depersonalisation, work demands, low levels of social support, and less active coping skills predicted suicidal ideation	JBI I low
Chopko et al. (2014)	USA	Cross-sectional	Urban and rural	193	Depressive traits predicted later suicidal ideation and behaviours	JBI I low
Di Nota et al. (2020)	Canada	Cross-sectional	Urban and rural	4236	Positive and strong relationship between comorbid substance use and mental health disorders and later suicidality	JBI I low
Meyer et al. (2003)	South Africa	Cross-sectional	N/A	307	Substance use, previous suicidal attempts, and job dissatisfaction was related to suicidal ideation and completed suicide	JBI I low
Nijiro et al. (2021)	Tanzania	Cross-sectional	Urban	497	Police officers who reported low perceived social support and depression were at an increased risk of suicidality	JBI I low
Pienaar and Rothmann (2005)	South Africa	Cross-sectional	N/A	1794	The more alcohol that was consumed per week, the higher the risk of suicidal ideation, with high alcohol consuming officers less able to cope and seek support	JBI I low
Pienaar et al. (2007)	Same as above				Avoidance coping was associated with higher levels of suicidal ideation	JBI I low
Quarshie et al. (2021)	Ghana	Cross-sectional	Urban	268	Officers who reported low levels of job satisfaction were at an increased risk of experiencing suicidal ideation during the previous 12 months. Additionally, being in a committed relationship act as a protective buffer against later suicidal acts	JBI I low
Rothmann and Strijdom (2002)	South Africa	Cross-sectional	Urban and rural	120	Low wages resulted in high rates of job dissatisfaction and suicidal ideation/acts	JBI I low
Rothmann and van Rensburg (2002)	South Africa	Cross-sectional	Urban and rural	287	Found a positive relationship substance use and suicidal behaviours, such that higher levels of drinking led to later suicidality	JBI I low
Rouse et al. (2015)	USA	Psychological autopsy	Urban	8	Developed a risk profile for suicidality including serious mental health issues, substance use, relationship strain, previous suicide attempts, history of negative life events, and pre-employment injury	CASP I low

Table 3 (continued)

Author(s)	Country	Research design	Setting	Participants	Key findings	Quality assessment tool and rating
Steyn (2012)	South Africa	Cross-sectional	Rural	217	In men, hyperarousal as well as avoidance and numbing contributed uniquely and significantly to suicidal ideation. In women, intrusive memories as well as level of impairment, contributed to suicidal ideation	JBI l low
Steyn et al. (2013)	Same as above				25% of the total variance in suicidal ideation is attributed to hyperarousal	JBI l low
Violanti (2004)	USA	Cross-sectional	Urban	115	In comparison to those with fewer years of service, officers with increased experience had less risk of PTSD and suicidal ideation. 'Persons dying' had the greatest impact on PTSD symptom scores and later suicidality	JBI l low
Violanti et al. (2008)	Same as above				Women officers who worked a greater percentage of their total hours on day shift tended to have a higher prevalence of suicide ideation. Among men with higher depression scores, the prevalence of suicidal ideation was significantly elevated with increasing percentage of hours worked on the midnight shift	JBI l low
Violanti et al. (2009)	Same as above				Depression and sex were positively associated with suicidal ideation in police officers. Findings also suggested that marital status modified the association between depression scores and suicidal ideation in women officers, with a notably stronger association in single women officers than in married women officers	JBI l low
Wray and Jarrett (2019)	Jamaica	Cross-sectional	Urban	305	Found a relationship between suicidal ideation and burnout among Jamaican police officers. Further (1) emotional exhaustion and depersonalisation are positively correlated with suicidal ideations, (2) differences in burnout among age, sex and rank, and (3) higher levels of emotional exhaustion among women officers	JBI l low

p. 4) study found that "emotional exhaustion and depersonalisation [were] positively correlated with suicidal ideation, with 51.4% of police officers showing moderate to high levels of emotional exhaustion, and 31.2% reporting moderate to high levels of depersonalisation".

Subordinate theme 2 – job dissatisfaction. Partly stemming from *burnout*, five independent studies found that a low sense of job satisfaction or job dissatisfaction showed statistically significant associations with suicidal ideation (Berg et al. 2003; Burke and Mikkelsen 2007; Meyer et al. 2003; Quarshie et al. 2021; Rothman and Strijdom 2002). More specifically, Quarshie et al. (2021) observed that officers who reported low levels of job satisfaction were at an increased risk of experiencing suicidal ideation during the previous 12 months. The researchers theorised that this finding should be expected given that "low job satisfaction may be a response to negative work experiences and unfavourable work characteristics, which can undermine the psychological health of police officers" (Quarshie et al. 2021, p. 198).

Theme 5: absence of a stable intimate relationship (35%; seven articles).

Two subthemes emerged, the absence of a committed relationship (subordinate theme 1: *civil status*) and problems within an existing relationship (subordinate theme 2: *relationship problems*).

Subordinate theme 1 – civil status. There was a consensus that officers who reported higher rates of suicidal ideation were either single, separated, or divorced (Berg et al. 2003; Burke and Mikkelsen 2007; Violanti et al. 2009). Thus, being married or in a committed relationship was a protective factor (Quarshie et al. 2021). However, Barron (2010) found that almost half or the police officers who committed suicide were married with children, suggesting that occupational relationships were poor, and thus, the personal relationships were not sufficiently protective.

Subordinate theme 2 – relationship problems. Many of the police officers who committed suicide experienced family conflicts (Barron 2010). This was suggested to indicate that difficulties in their personal relationships could result in the inability to cope with other difficulties (Berg et al. 2003). Beehr et al. (1995) reported that coping mechanisms were related to divorce potential, with rugged individualism increasing this potential. Additionally, some police officers were either the victim or alleged perpetrator of domestic abuse, which included the use of weapons or threat of weapon use (Rouse et al. 2015).

Research aim 2: to identify sex differences in the mode, methodology, or risk factors underpinning completed suicide in police officers.

The review comprised 9476 men and 3042 women. Of the 20 included articles, four studies (20%) specifically compared and contrasted suicide risk factors between sex. No sex differences were identified with regards to problematic substance misuse, the presence of depression and previous suicide attempts, or absence of a stable intimate relationship. As previously stated, and with regards to *PTSD*, women police officers showed a higher incidence and prevalence of intrusive memories, while men showed elevated levels of hyperarousal (Steyn 2012; Steyn et al. 2013). Women police officers also reported significantly higher levels of occupational stress and emotional exhaustion than men, with this sex disparity arguably a result of less peer support and supervision offered to women within the police force (Wray and Jarrett 2019).

Research aim 3: to identify any differences in risk factors for completed suicide between sworn and unsworn police officers.

There was a total of 9451 sworn officers, 350 unsworn, and 3717 unknowns. Although the different risk factors between unsworn and sworn officers were not detailed, there was evidence to suggest some differences. Sworn officers had higher levels of substance use and mental disorders (depression, PTSD, and stress), and civilians had a higher rate of PTSD (Di Nota et al. 2020). Therefore, most of the articles combined sworn and unsworn as a group, without distinguishing the differences between the groups. Thus, the results were more likely to be related to sworn officers.

Research aim 4: to review any police suicide risk factor differences between developed and underdeveloped jurisdictions.

In underdeveloped countries, educational levels for officers with high suicidal ideation were on average grade 12 or below. These officers also had lower ranks (Pienaar and Rothmann 2005). The wages in these countries were low (Steyn et al. 2013), which resulted in job dissatisfaction (Rothmann and Strijdom 2002). Thus, some police officers moonlighted, which resulted in increased suicidal ideation, which can be a result of emotional and physical exhaustion from working multiple jobs (Quarshie et al. 2021). Developed countries frequently have specific educational degrees for police officers, and the wages are higher. In developed countries, job dissatisfaction was related to anxiety and depression (Berg et al. 2003), and burnout from the job (Burke and Mikkelsen 2007) rather than low wages. Demographics are presented in Table 2.

Discussion

This systematic review is thought to represent the first known effort to qualitatively explore the factors implicated in the suicidal behaviours of law enforcement officers. Five superordinate risk factors were revealed: problematic substance use close to, or at the time of death; presence of depression and previous suicide attempts; differences in trauma response; exposure to excessive and prolonged

job-related stress, including dissatisfaction; and absence of a stable intimate relationship). When co-occurring or comorbid, these factors appeared associated with an increased likelihood of suicidal behaviours.

Concordant with the presumption of risk factor primacy (Violanti 2003, 2004), 40% of the included studies identified problematic substance use or substance misuse (i.e., alcohol and drugs) as both pervasive and directly linked to completed suicide. More specifically, the findings indicated an increasing trajectory of substance use in the days and hours preceding the suicidal event (Barron 2010; Rouse et al. 2015; Violanti 2004). Though concerning, such observations were not unexpected given that substance use has long been characterised as problematic among the police force (Richmond et al. 1998), with officers often regarded as 'symptomatic' drinkers, who use alcohol and other substances for the relief of psychological strains (Pienaar and Rothmann 2005). Indeed, it has been previously found that the organisational culture actually reinforces the use of substances as both a social and psychological device effective in the amelioration of job-related stress (Violanti 2003, 2004). This clearly raises challenges in relation to reinforcing unhelpful perceptions concerning coping and representing a potential barrier to treatment responsivity or those who require interventional support.

Mental health problems, more particularly depressive disorders and previous suicide attempts, were identified by the majority of policing studies (50%) as both comorbid with substance use disorders and predictive of later completed suicide (Barron 2010; Di Nota et al. 2020; Meyer et al. 2003; Violanti 2004). These findings represent expected risk predictors given that depression and suicidal ideation/attempts are considered incremental contributors to the overall risk burden in like occupational groups (e.g. emergency care workers, medical practitioners; Barron 2010; Berg et al. 2003). But while expected, rates of depression and suicidal ideation commensurate with non-working and institutionalised populations (Kessler et al. 1999) are curious given that police agencies should represent and consist of a healthy and psychologically tested working population (Violanti 2004). Equally interesting, across the aggregated samples, women officers reported higher mean depression scores compared to men (Violanti 2009). While some research has focussed on identifying causes of depression, most studies have been conducted with predominately male samples (Pierino 2007), and therefore have little probative value relevant to discerning the causal pathways implicated in the development of mood disorders in women officers.

While little support was found within the review for the argument that police officers were exposed to a singular traumatic critical incident which directly contributed to suicidality (Rouse et al. 2015), PTSD symptomatology when found to co-occur with substance use and mental health problems (i.e., depression and suicidal ideation) significantly increased overall suicide risk (Violanti 2004). Beyond elucidating the comorbidities that exist with other risk indicators and the resultant cumulative burden, two trauma specific findings emerged from this review. First, results showed that intrusive memories in women officers and hyperarousal in men were implicated in the later development of suicidal behaviours. Though this was argued by Steyn (2012) as stemming from women's tendency towards rumination and male problems with impulse control and affect regulation (Selye 1956), these arguments appear overly simplistic and should be interpreted cautiously. Second, it was found by Violanti (2004) that officers with increased police service showed less susceptibility to trauma-related stress and suicidality. Interestingly, this finding falls foul of the current and predominant position which holds that persons exposed to multiple traumatic episodes, as is commonly observed in veteran law enforcement officials, are more likely to exhibit PTSD symptomatology (Violanti 2004). Despite being potentially anomalous, Violanti's (2004) observations may also suggest experienced officers have developed more appropriate and varied coping mechanisms to adaptively and more effectively process work-related events, thereby decreasing overall symptomatologic risk. When considered holistically, these findings generally indicate that police officers face an initial period of trauma vulnerability before developing the necessary coping and cognitive skills that could act to insulate and protect the individual from further harm.

Apart from those risk predictors considered internal or specific to the constitutional makeup of the individual officer, occupational stressors, particularly burnout and job dissatisfaction, were found to significantly contribute to suicidal behaviours. Such results were not surprising given that both burnout and job dissatisfaction have been found to be positively related in other closed occupational groups (i.e., emergency care workers, medical practitioners; Stehman et al. 2019). Of note, findings from the review found that burnout components of emotional exhaustion and depersonalisation (or cynicism) only predicted suicidal tendencies via depression and anxiety (Berg et al. 2003; Burke and Mikkelsen 2007; Wray and Jarrett 2019). Thus, mood disorders seemingly mediate the relationship between wider occupational stressors and later suicidal behaviours. The findings serve to highlight both the incremental burden attributable to burnout and job dissatisfaction, and the comorbid relationships that exist across levels of stressors (i.e., interaction between personal and occupational risk predictors).

Contradictory findings also emerged with respect to the influence of relationship dynamics on overall suicidal burden. Indeed, while marriage or committed relationships were argued by some researchers to serve as a protective buffer against suicidal ideation and later behaviours (Berg et al. 2003; Burke and Mikkelsen 2007; Quarshie et al. 2021;

Violanti et al. 2009), equally, problems within partnerships (e.g. divorce) were indicated by other authors as constituting a motive for suicidality (Barron 2010; Beehr et al. 1995; Rouse et al. 2015). These findings suggest that the mere act of being in a civil relationship is insufficient to protect against suicidal behaviours but rather the quality of the intimate partnership is determinative of the protective function afforded (Barron 2010).

Rather than elucidating a clear framework by which to understand the development of suicidal behaviours in policing cohorts, the findings showed that individual (i.e. substance misuse, depression and previous suicide attempts, PTSD, relationship dynamic) and occupational (i.e., burnout and job dissatisfaction) risk factors, when taken in concert or amalgamated, create a 'critical mass' sufficient to lower the suicide threshold of the individual officer, thereby providing adequate motivation to engage in the target suicidal behaviour. Accounting for individual factors, previous engagement in suicidal behaviour, negative experiences, and a developed capacity to engage in suicidal behaviour all share parallels with the Interpersonal-Psychological Theory of Suicide (Joiner 2005) and Klonsky and May's (2015) Three-Step Theory. It would also appear that risk indicators specifically attributable to the organisation, such as lack of support, shift work, or access to lethal means did not emerge within the data. This perhaps highlights a need to develop models of understanding that are workplace specific and can take advantage of more contemporary research, while also extending to consider protective factors. What is clear from this review is that no one risk predictor, in and of itself, was sufficient to cause suicidal behaviours, but rather the multiplicative effect of "immersion in a vocational culture that stigmatises help-seeking, aggrandises [substance] use, and exposes an already compromised individual to ongoing, cumulative, and extreme stress" (Rouse et al. 2015, p. 102) necessitates cause for suicidal concern.

Implications

There are several implications that can be drawn from the review. First, studies noted that modern policing agencies were characterised by an organisational culture that appears to aggrandise substance use, while limiting or minimising the importance of mental health support and general well-being (Rouse et al. 2015). This is particularly concerning given that findings elucidated a direct and strong relationship between comorbid substance use and mental health disorders, and later suicidality (Barron 2010; Di Nota et al. 2020; Meyer et al. 2003; Violanti 2004). For that reason, suicide prevention would be bolstered by an organisational cultural shift that prioritises and places greater importance on mental welfare over the use of rugged individualism and maladaptive coping mechanisms. Second, the review findings

showed that organisational stressors, such as burnout and job dissatisfaction, clearly contributed to overall suicide risk (Berg et al. 2003; Burke and Mikkelsen 2007; Wray and Jarrett 2019). Hence, agencies would benefit from more advanced, comprehensive, and tailored internal guidelines that mitigate risk by promoting both meaningful occupational engagement and task manageability. Third, given that comorbid major mental disorders (i.e. depression, suicidal ideation, PTSD) and substance use principally contributed to later suicidal behaviours, interventions could consider integrated and hybrid modalities that address a range of challenges, which may include preparing an officer to engage in therapy by managing any feature that could present as a barrier to responsivity (e.g. alcohol use).

Limitations and Future Directions

The review is not without limitations. The searching of relevant databases and studies was potentially limited by publication and language biases. The heterogeneity of the included outcomes also precluded an extensive and direct comparison across all findings. In addition, while it was the intention of the researchers to comprehensively examine the evidence base to evidence any age, sex, and occupational (i.e., sworn versus unsworn) risk factor differences, only limited inferences may be drawn, given the disparities between sex and sworn/unsworn numbers. Finally, the majority of eligible studies employed a prospective, cross-sectional survey design, which apart from being fallible to subject biases (i.e. social desirability) offers limited predictive power in establishing cause and effect temporal relationships (Wang and Cheng 2020). The use of psychological autopsies in the studies of Barron (2010) and Rouse et al. (2015) are promising however, and further research would benefit from the improved adoption of such methodologies, given that it provides a more holistic and accurate outlook of those risk factors *known* to contribute to suicidal behaviours. It is also worth noting that no studies were identified that examined protective factors and which met the eligibility criteria for review. Future researchers are thus encouraged to study both risk and protective factors in tandem, as noted earlier.

Declarations

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

Informed Consent Not applicable. This study comprised of a systematic literature review/analysis of existing research.

Conflict of Interest The authors declare no competing interests.

References

Barron S (2010) Police officer suicide within the New South Wales police force from 1999 to 2008. Police Practice & Research: An Int J 11:371–382. https://doi.org/10.1080/15614263.2010.496568

Beehr TA, Johnson LB, Nieva R (1995) Occupational stress: coping of police and their spouses. J Org Behav 16:3–25. https://doi.org/10.1002/job.4030160104

Berg AM, Hem E, Lau B, Loeb M, Ekeberg Ø (2003) Suicidal ideation and attempts in Norwegian police. Suicide and Life-Threatening Behav 33:302–312. https://doi.org/10.1521/suli.33.3.302.23215

Braun V, Clarke V (2006) Using thematic analysis in psychology. Qual Res Psychol 3:77–101. https://doi.org/10.1191/1478088706qp063oa

Burke RJ, Mikkelsen A (2007) Suicidal ideation among police officers in Norway. Policing-an International Journal of Police Strategies & Management 30:228–236. https://doi.org/10.1108/13639510710753234

Carlier IV, Lamberts RD, Gersons BP (2000) The dimensionality of trauma: a multidimensional scaling comparison of police officers with and without posttraumatic stress disorder. Psych Res 97:29–39. https://doi.org/10.1016/s0165-1781(00)00211-0

CASP Critical Appraisal Skills Programme (2018) Critical Appraisal Skills Programme: making sense of evidence about clinical effectiveness: Qual Res Check 31.10.2021. Retrieved from: http://media.wix.com/ugd/dded87_951541699e9edc71ce66c9bac4734c69.pdf

Chopko BA, Palmieri PA, Facemire VC (2014) Prevalence and predictors of suicidal ideation among US law enforcement officers. J Police Crim Psychol 29:1–9. https://doi.org/10.1007/s11896-013-9116-z

Cooke A, Smith D, Booth A (2012) Beyond PICO: the SPIDER tool for qualitative evidence synthesis. Qual Health Res 22:1435–1443. https://doi.org/10.1177/1049732312452938

Di Nota PM, Anderson GS, Ricciardelli R, Carleton RN, Groll D (2020) Mental disorders, suicidal ideation, plans and attempts among Canadian police. Occupation Med 70:183–190. https://doi.org/10.1093/occmed/kqaa026

Hart PM, Wearing AJ, Headey B (1995) Police stress and well-being: integrating personality, coping and daily work experiences. J Occup Organ Psychol 68:133–156. https://doi.org/10.1111/j.2044-8325.1995.tb00578.x

Institute for Health Metrics and Evaluation (IHME; 2018) Findings from the Global Burden of Disease Study 2017. Seattle, WA: IHME

Joiner TE (2005) Why people die by suicide. Harvard University Press, Cambridge, MA

Kessler RC, Borges G, Walters EE (1999) Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey.

Arch Gen Psychiatry 56:617–626. https://doi.org/10.1001/archpsyc.56.7.617

Klonsky ED, May AM (2015) The three-step theory (3ST): a new theory of suicide rooted in the 'ideation-to-action' framework. Int J Cogn Ther 8:114–129. https://doi.org/10.1521/ijct.2015.8.2.114

Loo R (2001) Effective postvention for police suicide. Australian Journal of Disaster and Trauma Studies 5:132–139

Maslach C, Jackson SE, Leiter MP (1996) Maslach burnout inventory manual, 3rd edn. Palo Alto, CA: Consulting Psychologists Press

Meyer R, Rothmann S, Pienaar J (2003) Coping stress and suicide ideation in the South African police service in the Eastern Cape. SAJEMS 6:881–904. https://doi.org/10.4102/sajip.v45i0.1674

Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med 6(7):e1000097. https://doi.org/10.1371/journal.pmed.1000097

Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K, Mu P (2020) Systematic reviews of etiology and risk. In: Aromataris E, Munn Z (eds) JBI Manual for Evidence Synthesis. Available from https://synthesismanual.jbi.global

Njiro BJ, Ndumwa HP, Msenga CJ, Kawala T, Matola E, Mhonda J, Corbin H, Ubuguyu O, Likindikoki S (2021) Depression, suicidality and associated risk factors among police officers in urban Tanzania: a cross-sectional study. General Psychiatry 34:e100448. https://doi.org/10.1136/gpsych-2020-100448

Nugent WR, Williams M (2001) The relationship between the comorbidity of depression with problems in psychosocial functioning and the severity of suicidal ideation. Social Service Review 75:581–604. https://doi.org/10.1086/323164

Office of National Statistics (ONS; 2019) Suicide by population in England and Wales, 2011 to 2018. Accessed from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/adhocs/10807suicidebyoccupationenglandandwales2011to2018registrations

Pienaar J, Rothmann S (2005) Suicide ideation in the South African Police Service. South African J Psychol 35:58–72. https://doi.org/10.1177/008124630503500104

Pienaar J, Rothmann S, Van De Vijver FJR (2007) Occupational stress, personality traits, coping strategies, and suicide ideation in the South African Police Service. Crim Jus Behav 34:246–258. https://doi.org/10.1177/0093854806288708

Pierino K (2007) Women in the police department: the impact of being a token in a male-dominated organization. Doctoral dissertation: State University of NY at Buffalo, NY, May, 2007 presented at Suicide and Law Enforcement Conference, FBI Academy, Quantico, VA

Quarshie ENB, Odame SK, Annor F (2021) Suicidal behaviors in the Ghana Police Service. Crisis: J Crisis Intervent Suicide Prevent 42:194–201. https://doi.org/10.1027/0227-5910/a000707

Richmond RL, Wodak A, Kehoe L, Heather N (1998) How healthy are the police? A survey of life-style factors. Addiction 93:1729–1737. https://doi.org/10.1046/j.1360-0443.1998.9311172910.x

Rothmann S, Strijdom G (2002) Suicide ideation in the South African police services in the North West Province. SA J Ind Psychol 28(1):44–48

Rothmann S, van Rensburg P (2002) Psychological strengths, coping and suicide ideation in the South African police services in the North West Province. SA J Ind Psychol 28:39–49

Rouse LM, Frey RA, Lopez M, Wohlers H, Xiong I, Llewellyn K, Lucci SP, Wester SR (2015) Law enforcement suicide: discerning etiology through psychological autopsy. Police Quarter 18:79–108. https://doi.org/10.1177/1098611114563083

Selye H (1956) The stress of life. McGraw-Hill, New York, NY

Stehman CR, Testo Z, Gershaw RS, Kellogg AR (2019) Burnout, drop out, suicide: physician loss in emergency medicine, part I. West J

Emerg Med 20:485–494. https://doi.org/10.5811/westjem.2019.4.40970

Steyn R (2012) Gender differences in PTSD diagnostic criteria and suicidal ideation in a South African police sample. J Psychol Afr 22:235–238. https://doi.org/10.1016/S0924-9338(12)75610-9

Steyn R, Vawda N, Wyatt GE, Williams JK, Madu SN (2013) Posttraumatic stress disorder diagnostic criteria and suicidal ideation in a South African Police sample. African J Psych 16:19–22. https://doi.org/10.4314/ajpsy.v16i1.3

Violanti JM (1995a) The mystery within understanding police suicide. FBI Law Enforcement Bulletin 4:19–23

Violanti JM (1995b) Trends in police suicide. Psychol Rep 77:688–690

Violanti JM (2001) Police suicide: current perspectives and future considerations. Suicide and Law Enforcement Conference, FBI Academy, Quantico, VA

Violanti JM (2003) Suicide and the police culture. In D. Hackett & J. M. Violanti (Eds.), Police suicide: Tactics for prevention. Springfield, IL: Charles C. Thomas

Violanti JM (2004) Predictors of police suicide ideation. Suicide and Life-Threatening Behav 34:277–283. https://doi.org/10.1521/suli.34.3.277.42775

Violanti JM, Charles LE, Hartley TA, Mnatsakanova A, Andrew ME, Fekedulegn D, Vila B, Burchfiel CM (2008) Shift-work and suicide ideation among police officers. Am J of Indus Med 51:758–768. https://doi.org/10.1002/ajim.20629

Violanti JM, Fekedulegn D, Charles LE, Andrew ME, Hartley TA, Mnatsakanova A, Burchfiel CM (2009) Suicide in police work: exploring potential contributing influences. Am J Crim Justice 34:41–53. https://doi.org/10.1007/s12103-008-9049-8

Violanti JM, Vena JE, Petralia S (1998) Mortality of a police cohort: 1950–1990. Am J Ind Med 33:366–373. https://doi.org/10.1002/(sici)1097-0274(199804)33:4%3C366::aid-ajim6%3E3.0.co;2-s

Wang X, Cheng Z (2020) Cross-sectional studies: strengths, weaknesses, and recommendations. Chest 158:S65–S71. https://doi.org/10.1016/j.chest.2020.03.012

World Health Organisation WHO (2021) Suicide worldwide in 2019: Global health estimates. Geneva: Author. https://www.who.int/publications/i/item/9789240026643

Wray CA, Jarrett SB (2019) The relationship between burnout and suicidal ideations among Jamaican police officers. Int J Police Sci Manag 21:181–189. https://doi.org/10.1177/1461355719856026