

**LAW ENFORCEMENT CARDIOVASCULAR HEALTH:
A QUALITATIVE STUDY ON LAW ENFORCEMENT OFFICERS'
RISK AWARENESS AND THE TARGETED MITIGATION OF
CARDIOVASCULAR DISEASE**

by

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ABSTRACT

Cardiovascular disease-related deaths and injuries are prevalent among law enforcement officers (Han et al., 2017; Keeler et al., 2021), with attribution pointing to the strong associations between the inherent stressors of police work directly impacting the psychological and physical health of police officers (Santa Maria et al., 2018; Violanti et al., 2017). As such, several researchers have studied the associations between police officers' perceptions of stress and the presence of cardiovascular disease risk factors. However, there is a current gap in the literature on information examining the relationship between law enforcement officers' cardiovascular disease risk perceptions and their utilized health behaviors for mitigating such risk. The aim of this case study was to understand the perceptions of cardiovascular disease risk among law enforcement officers in Ohio, United States. Rosenstock's (1966/1974) health belief model theory, which suggests a positive relationship between one's perceptions of risk and health behaviors, provided this study's guiding principles. The researcher explored police officers' perceptions of their cardiovascular disease risk and their reported health behaviors. This researcher conducted in-depth interviews with a purposive sample of 11 Ohio law enforcement officers with varied demographic backgrounds. Following data collection and qualitative analysis, the researcher reported findings and provided recommendations for improving the lives of police officers, their families, and the communities they serve.

Keywords: law enforcement, cardiovascular disease (CVD), occupational stress, health belief model theory, cardiovascular health education

Dedication

To Craig.

Acknowledgments

In life, you will realize there is a role for everyone you meet. Some will test you, some will use you, some will love you, and some will teach you. But the ones who are truly important are the ones who bring out the best in you. They are the rare and amazing people who remind you why it's worth it. –Anonymous

First and foremost, I thank God for His unfailing love and provisions in my life. I am humbled and awed by the life of Jesus Christ and grateful for my relationship with Him. Although I am incredibly thankful for the opportunity to achieve such an accomplishment, I am simply a vessel. To God be the glory.

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Table of Contents

ABSTRACT.....	2
Dedication	3
Acknowledgments.....	4
List of Tables	11
List of Abbreviations.....	12
CHAPTER ONE: INTRODUCTION	13
Overview	13
Background	13
Situation to Self	18
Problem Statement	19
Purpose Statement	20
Significance of the Study.....	21
Research Questions	22
Operational Definitions	22
Summary.....	24
CHAPTER TWO: LITERATURE REVIEW.....	25
Overview.....	25
Theoretical Framework	27
Related Literature.....	32
Susceptibility and Severity of CVD in Law Enforcement.....	32
Law Enforcement Stress and Cardiovascular Disease.....	34
The Dynamic Effects of Law Enforcement Stress.....	36

Occupational Stress and Family Relationships.....	36
Occupational Stress Coping Methods.....	37
Trauma, Physiological Reactions, and Psychological Impairment.....	38
Strained Police-Community Relations.....	39
Police Officer Perceptions of Stressors.....	42
Metabolic Syndrome—Standard Measurements of Cardiovascular Disease Risk.....	44
Cardiovascular Disease Risk Factors.....	45
Body Composition and Physical Fitness.....	47
Metabolic Syndrome and Psychological Health	48
Metabolic Syndrome and Shiftwork.....	49
The Buffalo Cardio-Metabolic Occupational Police Stress Study.....	49
Measuring Subclinical Risk Factors	51
Subclinical Risk Factors, Body Composition, and Psychological Health	51
Shiftwork, Body Composition, and C-Reactive Protein	51
The Cortisol Awakening Response.....	52
The Cortisol Awakening Response and Shiftwork	53
The Cortisol Awakening Response and Flow-Mediated Dilation	53
The Cortisol Awakening Response and Heart Rate Variability	54
Cardiac Vagal Control	55
Retinal Vessel Diameter and Hypertension	55
Diurnal Salivary Cortisol	56
Cardiovascular Disease Interventions for Law Enforcement.....	57
Benefits and Barriers of Cardiovascular Disease Interventions for Law Enforcement....	58

LAW ENFORCEMENT CARDIOVASCULAR HEALTH: A	8
Screening	59
Stress Management.....	61
Physical Activity and Nutrition	64
Social Support.....	66
A Culture of Invincibility	68
Maslow’s Hierarchy of Needs Theory in Law Enforcement	69
A Christian Perspective	70
Summary of the Literature Review	72
CHAPTER THREE: METHODS	73
Overview	73
Research Design	73
Research Questions.....	81
Setting	81
Participants	84
Procedures	85
Institutional Review Board Approval	85
Consent for Participation.....	85
Interview Planning and Participation.....	86
Instrumentation and Operationalization of Constructs.....	86
Role of the Researcher	87
Data Collection and Interpretation.....	87
Interviews.....	87
Interview Questions.....	90

Observations.....	98
Field Notes	99
Data Analysis	99
Trustworthiness.....	101
Credibility.....	102
Dependability and Confirmability	103
Transferability.....	105
Strategies for Enhancing Trustworthiness.....	105
Prolonged Engagement	105
Thick Description.....	106
Audit Trail.....	107
Triangulation.....	107
Ethical Considerations.....	109
Summary.....	111
CHAPTER FOUR: FINDINGS.....	113
Overview.....	113
Participants	113
Results.....	118
Summary.....	159
CHAPTER FIVE: CONCLUSION.....	160
Overview.....	160
Summary of Findings.....	160
Discussion	161

Implications and Recommendations.....165

Limitations and Delimitations of the Study171

Recommendations for Future Research 173

Summary.....175

REFERENCES..... 176

APPENDICES..... 201

List of Tables

Table 1. Participant Age

Table 2. Participant Sex

Table 3. Participant Race

Table 4. Participant Years of Service

Table 5. Contributors to CVD in Law Enforcement

Table 6. General Population Comparison

Table 7. Overall Stress Rank

Table 8. Overall Stress Comparison to Other LEOs

Table 9. Self-Reported Risk of CVD

Table 10. Contributors to Individual CVD Risk

Table 11. Overall Stress, Individual CVD Risk, Risk Contributors

Table 12. Annual Traditional CVD Screening

Table 13. Stress, CVD Risk, and Management

Table 14. Physician Awareness of Occupation

Table 15. Participation in CVD Programs/Training

Table 16. Awareness of Specialized CVD Screening

Table 17. Specialized CVD Screening Prompts

Table 18. Lifestyle Factors

Table 19. Effects of CVD Event

Table 20. Overall Stress, CVD Risk, Spirituality

List of Abbreviations

American Heart Association (AHA)

Comparative Cognitive Response (CCR)

Cardiovascular Disease (CVD)

Health Belief Model Theory (HBM)

Hierarchy of Needs Theory (HNT)

International Association of Chiefs of Police (IACP)

Law Enforcement Officer (LEO)

Metabolic Syndrome (MetSyn)

Social Learning Theory (SLT)

CHAPTER ONE: INTRODUCTION

Overview

Law enforcement officers face significantly higher levels of cardiovascular disease (CVD) and cardiovascular disease risk factors than the general population (Han et al., 2017; Keeler et al., 2021). Related research indicates the prevalence of such problems may likely be due to associations between the effects of operational and organizational stressors of law enforcement work and the physical and psychological health of police officers (Santa Maria et al., 2018; Violanti et al., 2017). Such stressors can lead to sudden cardiac death and compromised metabolic functioning that contributes to cardiovascular disease (Violanti et al., 2017). Studies indicate that wellness programs aimed at cardiovascular education and intervention are necessary to mitigate cardiovascular risks to officers (MacMillan et al., 2017; Saffari et al., 2020), and there are various screening methods available for measuring cardiovascular profiles (Sheinberg, 2020; Violanti et al., 2018). Although research further indicates such programs are increasing across the United States (Taylor et al., 2021), there is limited data on the availability of cardiovascular wellness initiatives for police officers. Furthermore, literature on police officers' perceptions of their cardiovascular health is lacking. Additionally, there is limited literature on police officers' mitigation of their perceived cardiovascular disease risks.

Background

Historical Context

The occupational demands of law enforcement work include operational and organizational stressors unique to the field. Policing is considered one of the most stressful occupations in America (Purba & Demou, 2019). Operational demands include frequent

exposure to death, violence, trauma, human suffering, shift work, poor sleep quality, and compromised relationships between the public and the police (Purba & Demou, 2019; Santa Maria et al., 2018). Organizational demands often cited as primary stressors for officers (Maran et al., 2018; Purba & Demou, 2019) include bureaucratic frustrations, poor leadership and management, heavy workloads, and a lack of social support. Studies have shown such occupational demands of law enforcement significantly impact the cardiovascular health of law enforcement officers (Gendron et al., 2018; Violanti et al., 2017).

Most of the occupational demands of law enforcement work will not likely change due to the inherent nature of police work. Instead, a more realistic option may be a cumulative effort to increase awareness and promote effective methods of mitigation of the risks of cardiovascular problems among law enforcement. Ideally, such training should begin at the academy level and continue throughout an officer's career via in-service training. However, Blumberg et al. (2019) point out that while most police academy training includes a limited standardized curriculum on stress management training, there is little data on specific education about stress management related to cardiovascular disease. Whereas some research (Jones et al., 2019) points to no significant effects of employee wellness initiatives on medical spending, health behaviors, or productivity after a long-term period, other research (DeNysschen et al., 2018) indicates the effectiveness of physical wellness courses introduced before the police academy. Such studies demonstrated positive effects in preparing new police officers for a career in law enforcement. While early physical wellness education in basic police training sets the groundwork for law enforcement work, ongoing training and experiences expand officer knowledge throughout their career. Although many studies examined police officers' perceptions of stress, researchers know little about their perceptions of individualized cardiovascular risk or mitigation methods.

Social Context

Law enforcement's short- and long-term effects of stress impact officers and their families, agencies, and communities in various ways. In their annual report produced by the American Heart Association (AHA), Virani et al. (2021) noted that the average annual cost of cardiovascular disease among the general population from 2016 to 2017 was over 363 billion dollars. Whereas data from 2010 to 2019 indicates that job-related illness, including cardiovascular disease, was the second leading cause of death for police officers (National Law Enforcement Memorial Fund, 2020). In 2019, 147 officers died in the line of duty; the top four leading causes of death, respectively, were: gunfire (48), 9/11-related cancer (24), automobile crashes (22), and heart attack (19) (Officer Down Memorial Page, 2020). In that same year, the benefit payment amount for death and disability benefits per person was \$359,316.00 (U.S. Department of Justice Bureau of Justice Assistance, 2020). Granted, the financial impact on society of a law enforcement cardiovascular disease-related death may seem meaningless to those affected by the death and disability claims on behalf of their loved ones. However, economic losses have a societal impact by virtue of benefits paid out and the loss of human capital. The government has a fiduciary obligation to minimize financial stress on stakeholders and protect public health (Thomaselli et al., 2018); such responsibility encompasses protecting those assigned to protect others.

Furthermore, regardless of the cause, the death of a law enforcement officer creates a significant loss for everyone. Exacerbating the damaging effects of a line-of duty-death, such as the cardiovascular death of an officer, is the lingering question of whether something could have prevented such type of death. The staggering statistics and notable associations between law enforcement work and cardiovascular risks to officers warrant such questions. Fortunately, there

have been recent increases in wellness programs for officers focused on stress management and mitigation (Blumberg et al., 2019; Kuehl et al., 2016; Saffari et al., 2020; Taylor et al., 2021). As indicated by the International Association of Chiefs of Police (IACP) (2018), such programs often aim to assist officers via performance-based methods, directly impacting how they perform their duties and obligations to public service. On the other hand, some programs focus solely on education and awareness to improve lives and reduce risks. Furthermore, many such wellness programs have also been proven effective at increasing ethical integrity while also improving the resiliency and mindfulness of police officers (Blumberg et al., 2019; Christopher et al., 2020).

Theoretical Context

Similar to concepts of Bandura's social learning theory (SLT) (1977) and based on Vroom's expectancy theory (Vroom, 1964), the health belief model theory (HBM) identifies six principles for predicting whether people will engage in the prevention and mitigation of health concerns. The six HBM principles include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Rosenstock, 1966/1974). One study applying the HBM theory to cardiovascular intervention in law enforcement showed short-term improvements in cardiovascular health (Saffari et al., 2020). However, it is essential to note that different demographic, social, and emotional variables moderate differences in perceptions and mitigation of health risks (Conner & Norman, 2017). Applying concepts adopted from the HBM theory in a study examining police officer perceptions of awareness and mitigation of cardiovascular risks would establish a baseline for future research, identify areas of needed improvement, and potentially impact the health of society by optimizing the cardiovascular health of law enforcement officers.

Additionally, the current literature on cardiovascular health risks for law enforcement includes the biological responses of stress, including psychological and physiological responses. Common psychological reactions to stress include depression, anxiety, post-traumatic stress disorder (PTSD), and suicide (Courts & Mosniak, 2015; Maran et al., 2018; Thoen et al., 2020; Violanti et al., 2017). Physiological responses to stress include an increased risk of sudden cardiac death, metabolic syndrome (Met Syn), and other body system dysfunctions. Indeed, officers experience the stress of law enforcement work and its effects throughout their careers. Yet, we do not know if police officers are aware of, or understand, the impact of psychological and physiological effects of stress on their cardiovascular health. Wellness courses designed to teach officers how to understand and respond to such involuntary reactions may be practical (International Association of Chiefs of Police, 2018). However, understanding the physiological responses to stressors may also have iatrogenic effects that extend beyond their comprehension of bodily reactions. Not only may officers develop such an understanding of the effects of stress, but their acknowledgment that they cannot control the involuntary reactions may influence the rejection of the warrior culture of invincibility commonly prevalent in law enforcement work.

The HBM theory suggests that individuals' subjective perceptions about a health problem influence their health behaviors (Champion & Skinner, 2008; Rosenstock, 1966/1974). Therefore, from a theoretical standpoint, police officers' perceptions of the susceptibility and severity of CVD health risks, their perceptions of the benefits and barriers of mitigation, and their cues to action, should influence their health behaviors. Applying the HBM theory, police officers' perceptions of CVD could contribute to the prevalence of cardiovascular disease-related injury and deaths of law enforcement officers.

Situation to Self

Many people enter into careers in criminal justice to fulfill a mission to help others. They expand upon their natural problem-solving abilities by gaining experience, knowledge, and continuous training. They spend their entire careers working progressively towards controlling and preventing problems. They also acknowledge that, despite their best efforts, bad things happen to good people. Notwithstanding these acknowledged realities, when a 42-year-old, physically active, seemingly-healthy law enforcement officer dies unexpectedly from a cardiovascular issue, people begin asking the same questions asked when other tragedies occur—What went wrong? How could this have been prevented? What can we do to fix this problem? The tragic situation described above served as the motivation for the proposed study.

Although the research indicates a higher risk of cardiovascular disease among law enforcement officers than the general population, many law enforcement officers do not afford themselves the wellbeing protection they provide others. The evidence suggests that cardiovascular problems among this population may result from the unnaturally high levels of acute and chronic stressors of law enforcement work. Yet, there may be unknown factors surrounding this phenomenon as well. Therefore, until we understand the breadth and depth of the problem—including its root causal and correlational factors—attempts at intervention are futile.

An epistemological, philosophical assumption guided the proposed exploratory, interpretive case study. Exploratory case studies have an epistemological foundation focused on acquiring and validating knowledge; thus, they can be qualitative or quantitative in scope. Qualitative researchers frequently opt for an exploratory design as its goal is answering questions about how or why something is the way it is (Mills et al., 2012). Researchers also often use the

exploratory approach to investigate a phenomenon not clearly identified or historically studied, as is the case for understanding the subjective perceptions of law enforcement officers regarding their cardiovascular health. A positivistic approach typically relies on a quantitative approach with broader datasets (Mills et al., 2012; Yin, 2017). It suggests an absolute outcome or single truth for discovery and confirmation, whereby researchers look at the phenomenon via the lens of causal relationships (Yin, 2017).

Conversely, the interpretive approach seeks deeper sets of qualitative data and suggests no single truth about a phenomenon (Sivado, 2020; Takahashi & Araujo, 2020; Yin, 2017). Rather, its hermeneutic qualities require exploring and studying multiple viewpoints and social interactions (Gyollai, 2020; Sivado, 2020). Further, Mills et al. (2012) note that exploratory case studies characterized by fundamental exploration of some unknown phenomenon suggest eventual generalizations that contribute to existing literature and promote subsequent causal studies. Thus, a primary goal of the proposed case study was to contribute knowledge that ultimately works for the common good by improving the lives of law enforcement officers, their families, and those they serve.

Problem Statement

Law enforcement officers face significantly higher cardiovascular disease rates and cardiovascular disease risk factors compared to the general population (Han et al., 2017). There are notable associations between the effects of stress relative to police work and cardiovascular problems for law enforcement officers (Brunetti et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018; Violanti et al., 2017). While some studies examine perceptions of stress among law enforcement officers (Violanti et al., 2017) and how stress relates to cardiovascular health profiles (Saffari et al., 2020), the available data on subjective perceptions of police officers

regarding their cardiovascular risk is limited. Moreover, there is little available information on police officers' reported methods of mitigation of cardiovascular disease risks

Despite significant research on the associations between the effects of stress and the cardiovascular health of police officers, there is limited data available on the potential relationship between their subjective risk perceptions and specific behaviors aimed at mitigating cardiovascular disease. Research suggests that risk awareness affects health behaviors (DeNysschen et al., 2020; Ramey et al., 2017; Rosenstock, 1966/1974; Saffari et al., 2020). Therefore, law enforcement officers' subjective perceptions of cardiovascular risk should theoretically correlate with their reported health behaviors. Subsequently, given the high risk of cardiovascular disease among the law enforcement population, education that increases risk perceptions and promotes mitigation should reduce the number of law enforcement deaths caused by cardiovascular problems. The problem is that we do not know enough about how officers perceive or mitigate their risks of cardiovascular health problems, nor do we know the quality or quantity of cardiovascular health education among the law enforcement population. Thus, criminal justice researchers and practitioners have limited information on effective interventions for reducing cardiovascular disease among law enforcement officers.

Purpose Statement

The purpose of this qualitative case study was to explore law enforcement officers' perceptions of cardiovascular disease risk and their health behaviors in mitigating such risks. Law enforcement officers' perceptions of cardiovascular disease were generally defined as their attitudes and beliefs about their risk of cardiovascular health problems, focusing on occupational stressors and their physiological effects. The researcher generally defined officers' mitigation methods as their reported health behaviors to reduce their perceived risks. The theory guiding

this study was the health belief model (Rosenstock, 1966/1974), as it suggests perceptions of health problems affect actions taken towards reducing such risks.

This research was a qualitative case study undertaken to gain insight and understand the subjective perceptions and mitigation of cardiovascular disease risk of law enforcement officers. The researcher acquired non-archival data through one-on-one, face-to-face, in-depth interviews using open- and closed-ended questions. The sample consisted of 11 law enforcement officers with varied demographic backgrounds. The study reveals detailed information about how police officers perceive their risk, their methods of mitigating such risk, and their exposure to cardiovascular education. The researcher identified themes that could potentially increase cardiovascular health intervention among the law enforcement population.

Significance of the Study

Because there are significant associations between cardiovascular disease and cardiovascular disease risk factors among law enforcement officers (Han et al., 2017; Thayyil et al., 2020; Santa Maria et al., 2018; Violanti et al., 2017), mitigation of such is critical. Targeted educational intervention that influences law enforcement officers' perceptions to increase health behaviors may reduce the number of cardiovascular disease-related deaths of law enforcement officers. Therefore, we must first understand officers' perceptions of their susceptibility and the severity of the problem, their perceptions about the benefits and barriers of mitigation, and current educational practices, before implementing or expecting effective intervention.

The available research indicates scholars are aware of the risks of cardiovascular health problems within law enforcement, and several scholars point to the need for programs aimed at wellness and stress management education (Blumberg et al., 2019; Ramey et al., 2017; Saffari et al., 2020; Taylor et al., 2021). However, there is limited data on police officers' perceptions of

the problem or available cardiovascular education. Because only one identified study analyzed police officers' perceptions of cardiovascular disease, this case study will contribute to the current gap in the literature. Policymakers and criminal justice professionals are ethically obligated to educate police officers on the known risks to their health. The Peelian principles of policing suggest several factors still relevant today, including the overarching philosophy that the public is the police, and the police are the public (Adegbile, 2017). As such, the outcome of this study may contribute to solutions for improving the health of police officers, which thus affects the welfare of society in general.

Research Questions

This study aimed to answer the following research questions: 1) How do law enforcement officers perceive their cardiovascular disease risk? 2) How do law enforcement officers mitigate their cardiovascular disease risk? Although research has shown that police officers are at high risk of cardiovascular disease (Thayyil et al., 2020), we do not know about their perceptions and mitigation of such risks. Further, the available data does not indicate police officers' awareness of their risk of cardiovascular disease, their understanding of the physiological stress responses known to cause metabolic changes (Violanti et al., 2018), or their awareness of targeted cardiovascular health screenings available (Sheinberg, 2020).

Operational Definitions

1. *Cardiovascular disease*: Heart problems including atherosclerosis, cardiomyopathy, heart attack, stroke, heart failure, arrhythmia, and heart valve problems (AHA, 2021).
2. *Cardiovascular health education*: Information distributed to police officers about the susceptibility, severity, benefits, barriers, and methods of mitigation of cardiovascular disease (Saffari et al., 2020)

3. *Positive health behavior*: Behaviors such as scanning for cardiovascular disease risks, practicing stress management, and lifestyle factors aimed at reducing the risk of cardiovascular disease.
4. *Metabolic syndrome*: Having three or more of the following measurements: abdominal obesity, triglyceride level of 150 mg/dL or greater, HDL cholesterol of <40 mg/dL (men) or <35 mg/dL (women), systolic blood pressure of 130 mm Hg or greater, or diastolic blood pressure of 85 mm Hg or greater, and fasting glucose 100 mg/dL or greater (AHA, 2021).
5. *Occupational stress*: “Consists of the harmful physical and psychological consequences to individuals that result when an imbalance exists between demands of the work environment and individual needs, abilities, and resources” (Psychology, 2020, Occupational stress section, para. 1).
6. *Perceived Barriers*: “The potential negative aspects of a particular health action” (Champion & Skinner, 2015).
7. *Perceived Benefits*: “Various available actions for reducing the disease threat” (Champion & Skinner, 2015).
8. *Perceived severity*: “Feelings about the seriousness of contracting an illness or leaving it untreated” (Champion & Skinner, 2015).
9. *Perceived susceptibility*: “Beliefs about the likelihood of getting a disease or condition” (Champion & Skinner, 2015).
10. *Physiological stress responses*: The involuntary, biological reactions to stress, such as increased cortisol and adrenaline levels activated by the biological responses of the autonomic nervous system (Violanti et al., 2017).

Summary

Law enforcement work encompasses unique occupational stressors that ultimately impact the cardiovascular health of police officers (Purba & Demou, 2019). Many law enforcement stressors are inherent to the profession and, therefore, likely to remain static over time. Moreover, physiological reactions to stress can increase risk factors that affect cardiovascular health. Because such occupational stress is inevitable and biological reactions are involuntary, education on awareness about the susceptibility and severity of the problem and the benefits and barriers to specific mitigation methods is critical. Currently, there is limited available data on police officers' perceptions of cardiovascular disease risk and the effects of said perceptions on their health behaviors. This study examined and analyzed police officers' perceptions and mitigation of cardiovascular disease risks.

CHAPTER TWO: THE LITERATURE REVIEW

Overview

The literature review includes studies on several components of cardiovascular health among law enforcement officers. There is a current gap in the literature on police officers' perceptions of awareness and mitigation of cardiovascular disease (CVD) and the cardiovascular health education of police officers. However, much of the literature includes studies on the high risks of CVD among police officers and the significant impact of occupational stressors on their psychological and physical health. The literature also includes studies on the physiological responses to stress and the need for health programs aimed at stress management. Many articles relate to specific protective factors for reducing stress and the review of programs designed to improve wellness implemented in police agencies. The ample research demonstrates links between law enforcement work and police officer susceptibility to cardiovascular disease-related issues and the necessity for awareness and intervention to reduce the number of cardiovascular disease-related deaths among this population. The health belief model (HBM) theory suggests correlations between police officers' perceptions of cardiovascular health and their motivation to adopt behaviors to reduce their risks (Rosenstock, 1964; Rosenstock, 1974). For this study, the researcher will integrate concepts of the HBM theory to examine connections between police officers' perceptions of awareness of cardiovascular disease risk and their practiced methods of cardiovascular disease prevention. The researcher will also explore the cardiovascular health education of police officers.

Literature Search Strategy

The initial strategy of the researcher was a general search of *cardiovascular disease among law enforcement* in the Liberty University online library. Of the 347 results, 40 articles

applied to the study. The researcher also conducted a search within the Liberty University library on *stress among law enforcement*, which yielded 14,550 results; when the researcher narrowed the search to *stress cardiovascular disease law enforcement*, 129 results resulted, some of which were duplicates of the previous search; six were useful. The researcher also searched the *cardiovascular health belief model*, which yielded 244 results, of which ten were applicable. The researcher also searched using the same terms in online journals such as ProQuest, PubMed, Research Gate, and Taylor and Francis Online. These searches often yielded the same articles and provided access to additional research. Additionally, the researcher reviewed the authors' lists of references in each relevant article to search for applicable content within the last five years. In total, there are 175 references for the study. Fifteen of the resources came from textbooks for descriptive and historical theoretical purposes. Sixteen of the resources were published over five years ago or in a non-peer-reviewed journal (ten and six, respectively). Therefore, the majority of the total references were from academic, peer-reviewed journals published within the last five years.

The research demonstrates associations between law enforcement work and occupational stressors known to lead to cardiovascular disease risk factors (Andrew et al., 2017; Bauhman et al., 2016; Gendron, 2018; Gu et al., 2018; Holst et al., 2019; Gonzalez et al., 2019; Violanti et al., 2017; Violanti et al., 2017; Violanti et al., 2017; Violanti et al., 2018; White et al., 2019). Research also demonstrates the continued use and effectiveness of the HBM theory. It applies to adopted health behaviors based on perceptions of susceptibility and severity of a problem and perceptions of the benefits and barriers to mitigation (Luquis et al., 2018; Saffari et al., 2020).

Whereas ample research demonstrates the necessity for awareness and intervention to reduce the number of cardiovascular disease-related deaths among the law enforcement

population, there is a lack of research on officer perceptions and mitigation of cardiovascular disease risk factors. The researcher found only one study on the effects of cardiovascular health education based on the HBM theory on law enforcement officers' perceptions and health behaviors (Saffari et al., 2020). Saffari et al. (2020) determined a short-term educational intervention was positively associated with improved health behaviors of police officers; however, this study had limitations of a lack of a control group and long-term follow-up. Furthermore, Saffari et al. (2020) conducted their study on a sample of police officers in Iran, which may not be generalizable to other countries. The indicated gap in the literature warrants the need for this study.

Theoretical Framework

The Health Belief Model Theory

The concept driving the study comes from the health belief model (HBM) developed by Rosenstock (1966/1974), who theorized that six primary factors determine individuals' health behaviors. Rosenstock created the initial HBM theory to understand why and under what circumstances people adopt health behaviors to prevent, detect, and diagnose disease to promote public health (Rosenstock, 1964). The early theory consisted only of perceived susceptibility, severity, benefits to intervention, barriers to intervention, and cues to action; the theory was later modified to formally include self-efficacy (Becker & Rosenstock, 1991; Rosenstock, 1974). Since its inception, researchers and practitioners have applied the HBM theory to various health behaviors and populations (Conner & Norman, 2017).

The theory posits the probability of health behavior actions increases as perceptions of susceptibility and severity to the condition increase. An individual's perceptions of barriers and benefits determine the direction of the health behavior dependent upon awareness of the action,

availability, and whether it is effective. Demographics such as age, sex, ethnicity, education, personality, and knowledge are modifying elements affecting perceptions. Importantly, Rosenstock acknowledged that the HBM does not provide an exhaustive explanation of health behaviors. Instead, the components work as constructs congruously and sometimes independently to generally predict health behaviors.

Rooted in social learning theory (Bandura, 1977), the conceptual origins of the HBM theory emphasize the role of motivation necessary for action. From the perspective of social learning theory, the HBM theory stresses two factors: 1) the psychological state of readiness to take action, which aligns with the perceived susceptibility and severity and self-efficacy elements of the HBM; 2) the perceptions that such action is beneficial to the actor, which aligns with the benefits and barriers elements of the HBM theory (Bandura, 1977; Bandura, 1991; Rosenstock, 1966).

Also emphasizing the effort-rewards balance perceptions affecting motivation, concepts of the HBM theory parallel elements of Vroom's expectancy theory, which suggests three factors determine action: expectancy, instrumentality, and valence (Lussier & Hendon, 2019; Vroom, 1964). The theory proposes that behaviors result from motivations determined by expected utility and rewards associated with the behavior. Expectancy refers to the ability of an individual to act and whether the individual has the skills required to complete the action, paralleling the self-efficacy concept of the HBM. The expectancy element also includes an individual's perceptions of control over the outcome. Instrumentality, based on trust, control, and past experiences reflective of a correlation between the performance and the behavior, refers to perceptions about receiving the expected reward. This element parallels the balance or imbalance between perceived benefits and barriers of the HBM theory. The third element, valence, refers to the

weight and value of the perceived reward based on individual needs, goals, and values, paralleling the concepts of perceived benefits and perceived barriers in the HBM theory.

Perceptions of susceptibility are individuals' beliefs about their risk of developing a condition (Rosenstock, 1966). Perceptions of severity are an individual's subjective degree of consequences of developing a condition. Such perceptions may result from emotional responses, such as the effects of the situation on one's life or family, or perceptions of potential medical challenges of the condition, such as death or debilitating illness (Rosenstock 1966/1974). The combined constructs of perceptions of susceptibility and perceptions of severity constitute the perceived threat (Champion & Skinner, 2015; Conner & Norman, 2017).

An individual's perceptions of barriers and benefits of the action require some level of acceptance of susceptibility to a condition. The perceived benefits construct is an individual's subjective beliefs about the potential positive aspects of an action, whereas the perceived barriers construct is their beliefs about the possible negative aspects or blocking of the activity (Champion & Skinner, 2015; Rosenstock, 1966/1974). These two constructs, weighed together, serve as a measurement of the direction of an action based on an individual's subjective beliefs about the availability and effectiveness of the action taken (Rosenstock 1966/1974).

Cues to action serve as internal or external modifiers acting on perceptions about the condition. Internal cues to action may include physical symptoms or the perception of symptoms, whereas external cues to action may be interpersonal interactions (such as urging from a physician), the impact of education, or someone else diagnosed with the condition) (Rosenstock, 1966/1974). As noted by Rosenstock (1966/1974) and Champion and Skinner (2015), studying cues to action may be difficult due to the challenges of weighing and understanding various

interpersonal influences. However, Rosenstock (1966) suggested a prospective design study to examine how cues to action modify perceptions.

Self-efficacy refers to the social cognitive concepts of an individual's subjective belief in their ability to act (Bandura, 1991). Although Rosenstock and colleagues later added the concept of self-efficacy to the HBM theory, its indicated presence in the original model suggested cognitive and emotional elements impact definitions of susceptibility among individuals (Rosenstock, 1966). Self-efficacy may vary across populations and demographics and is predictive of a person's behavior (Champion & Skinner, 2015).

Rosenstock (1966/1974) acknowledged limitations of the HBM theory warranted further study and encouraged deeper investigation into its constructs. Becker (1974) argued the HBM should include elements of readiness to measure health motivation. Conner and Norman (2017) also point to the importance of considering demographic factors that potentially affect health perceptions and behaviors. LaMorte (2019) cited the HBM theory as descriptive rather than explanatory. He noted limitations due to its exclusion of an individual's attitudes and beliefs, external factors influencing the individual's ability to take action, and assumptions that everyone has equal access to information. Further, LaMorte (2019) suggested integrating the HBM theory with others when assessing health behaviors.

Despite its weaknesses, researchers continue to widely use the HBM for investigating health perceptions and behaviors. Luquis et al. (2018) applied the HBM to health interventions for young adults. The authors studied 1,000 young adults (between the ages of 19 and 34). They found differences in perceptions of susceptibility and severity among different demographics, such as gender, health status, and age (Luquis et al., 2018). Further, the study revealed that such perceptions might impact individuals' utilization of preventive services. Although the study may

not be generalizable to the law enforcement population, police officer demographics often parallel young adults, such as their higher-risk behaviors, access to health insurance, and the availability of prevention services.

Furthermore, one study by Hwang and Kim (2019) found that in a cohort of blue-collar workers, after controlling for other covariates, statistical predictions indicated health-promoting behaviors would increase by 4.0 and 1.05 times as CVD risk perceptions and self-regulation, respectively, increased by 1.0 time. Data such as this support the concepts of the theory that a culmination of knowledge (perceptions of susceptibility and severity), rewards (perceptions of barriers and benefits of intervention), and self-determination (self-efficacy) determine health behaviors. Further studies on police officer perceptions of susceptibility and severity are warranted.

In their study applying concepts of the HBM to CVD education of police officers, Saffari et al. (2020) found a short-term intervention effective at changing perceptions of cardiovascular health and reducing risk factors. Noting the associations between law enforcement work and cardiovascular health, the researchers believed that the most effective strategies for CVD intervention include a healthy diet, regular exercise, stress management, and weight control (Saffari et al., 2020). The study consisted of 58 police officers in Iran exposed to five weeks of cardiovascular health education based on the HBM. Participants included officers with at least three predefined CVD risk factors. In addition to perceptions of susceptibility, severity, benefits, barriers, cues to action, and self-efficacy, researchers added a seventh construct, preventive behaviors. Following exposure to the intervention, researchers noted increases in all seven constructs.

Additionally, from baseline to follow-up, measurements of risk factors improved for all participants (Saffari et al., 2020). Although the effects of such intervention are promising, there are limitations to the study. The absence of a control group and the geographical location (Iran) limits generalizability across groups; further, no control group prevented attribution of the improvements to the intervention. Also, the short-term (three months) follow-up prohibited assessment of long-term changes. The researchers cite the need for additional studies, including a control group and participants with varied CVD risk factors.

Rosenstock's (1966) philosophy drives the elements of the HBM and applies to the concepts of this study. This theory posits that understanding and predicting behavior should occur before persuading someone to adopt a health behavior because behavior modification emerges from understanding causation (Rosenstock, 1966). As the theory indicates, several demographic factors may influence police officers' perceptions of cardiovascular disease, subsequently predicting their health behaviors. Cardiovascular health and risk knowledge may modify police officer perceptions and function as a cue to action towards mitigation. Currently, there is limited available data on police officers' perceptions of cardiovascular disease susceptibility and severity and their perceptions of barriers and benefits of mitigation. Furthermore, the existing literature on the availability and impact of education on police officers' perceptions and mitigation of cardiovascular disease is lacking.

Related Literature

Susceptibility and Severity of Cardiovascular Disease in Law Enforcement

Ample research suggests that law enforcement officers are highly susceptible to cardiovascular disease (CVD) (Gendron et al., 2018; Meena et al., 2018; Reingle Gonzalez et al., 2019; Thayyil et al., 2020; Violanti et al., 2018b; Violanti et al., 2020; White et al., 2019)

compared to the general population (Keeler et al., 2021). Although CVD ranks as the number one killer of American people (George et al., 2017; Keeler et al., 2021; Thomaselli et al., 2018) and is the common cause of death among developed countries (Michaud et al., 2019), the statistics look different for law enforcement officers compared to the general population. Research by Keeler et al. (2021) indicated CVD risk factors might progress more rapidly in law enforcement officers than in the general population. Likewise, in their study of police officers and firefighters in Korea, Han et al. (2017) noted a higher risk of CVD among police officers compared to the general population. The average age of a police officer who experiences a heart attack is 49 years old, whereas the average age of someone in the general population who experiences a heart attack is 65 years old. Approximately 40% of police officer heart attacks occur at the age of 45 (Sheinberg, 2020).

Whereas evidence indicates associations between cardiovascular disease and law enforcement work, with foci on the various occupational stressors of the job, a comprehensive review by Magnavita et al. (2018) on the subject revealed inconstant outcomes of cross-sectional and longitudinal studies. Magnavita et al. (2018) found that not all studies demonstrated strong associations between law enforcement stress and CVD. Notably, the review concluded that, although the evidence of an association was sometimes weak, the prevalence of CVD among law enforcement personnel indicated further research and interventions aimed at mitigation.

Violanti et al. (2020) studied law enforcement deaths over 22 years (1997 to 2018). The study revealed that out of the 3,645 law enforcement officers killed in the line of duty (LOD) in that period, 646 deaths were likely the result of job-related illnesses, including cardiovascular disease (Violanti et al., 2020). Cardiovascular disease-related deaths accounted for over half (52.6%) of the 646 deaths; 81.8% of the CVD-related deaths were due to a fatal heart attack (also

called myocardial infarction [AHA, 2021]), and 74.3% occurred among people between 40-60 years of age (Violanti et al., 2020).

Law Enforcement Stress and Cardiovascular Disease

Researchers and physicians point to potential causes of cardiovascular disease among law enforcement, namely a culmination of factors involving inherent stressors of the job and the maladaptive behaviors officers adopt in response to said stressors (Baldwin et al., 2019; Magnavita et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018; Violanti et al., 2017; Violanti et al., 2020; White et al., 2019). Many of the law enforcement officers' maladaptive responses include self-medication, burnout, withdrawal from emotionally supportive relationships, substance abuse issues, inadequate nutrition, sleep deprivation, and a developed indifferent mindset toward their lives and those around them (Baldwin et al., 2019; Magnavita et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018; Violanti et al., 2017; Violanti et al., 2020; White et al., 2019). As research indicates that law enforcement is one of the most stressful occupations (Baldwin et al., 2019; Baughman et al., 2015; Purba & Demou, 2019; Violanti et al., 2017; White et al., 2019), with unique stressors (Queiros et al., 2020), there is a common understanding that stress is an inherent component of law enforcement work.

Importantly, frequently measured police officer perceptions of stress and health suggest a general acknowledgment of the importance of this variable among researchers. However, there are limitations to studying stress as it can be multifactorial and subjective, and limited by changing conditions and experiences (Magnavita et al., 2018). The occupational stressors of law enforcement often have cyclical effects which significantly impact the lives of police officers (Meena et al., 2018). Additionally, the research offers insight into associations between the

unique occupational stressors of law enforcement and the biological effects that contribute to cardiovascular disease.

Operational stressors of law enforcement work often include exposure to death, human suffering, violence, disaster, shift work, disruptive sleep habits, and poor public relationships (Holst et al., 2019; Magnavita et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018).

Acute law enforcement operational stressors include direct and indirect involvement in a critical incident situation, such as an act of violence, trauma, or death. Chronic law enforcement operational stressors relate to the high frequency of such encounters over time and the repeated exposure to constant negativity.

Given the inherently stressful nature of the job and their initial training, police officers enter the field somewhat prepared for the high demands of operational stressors of law enforcement work (Blumberg et al., 2019; DeNysschen et al., 2018). However, officers are often unprepared for the organizational stressors of their careers, which can also impact their health. Studies point to organizational stressors such as unsupportive leadership, poor management, and weak social support that officers perceive as frequent stressors (Andrew et al., 2017; Purba & Demou, 2019; Queiros et al., 2020; Santa Maria et al., 2018; Violanti et al., 2016). The weight of organizational stressors is perceived to be just as stressful for police officers assigned to administrative roles as it is for frontline police officers (Magnavita et al., 2018). Administrative roles within law enforcement may include evidence technicians, telecommunications officers, internal affairs personnel, or other reduced-contact roles. Frontline law enforcement roles may include operations employees such as road patrol, traffic control, specialized response teams, and other roles that require increased police-citizen contacts (Magnavita et al., 2018). Other studies (Yadav et al., 2021) point to the positive relationship between quality of work-life and wellbeing

(including physical and emotional health) among police personnel. Similarly, Demou et al. (2020) noted police officers with perceptions of lower quality of work-life suffered from more significant mental and physical problems.

The Dynamic Effects of Law Enforcement Stress

Noting the associations between law enforcement work, stress, and cardiovascular disease, several researchers (Garbarino et al., 2015; Garbarino et al., 2019; Hartley et al., 2011; Thayyil et al., 2020; Violanti et al., 2006; Violanti et al., 2019) conducted studies on such factors. Subsequently, they compared perceptions of various kinds of stress with other variables, such as self-reported coping skills and clinical cardiovascular health profiles. Such studies noted clinical risk factors of cardiovascular disease prevalent among law enforcement officers include body mass index, high low-density cholesterol, low high-density cholesterol, high blood pressure, glucose intolerance, abdominal obesity, and metabolic syndrome (Garbarino et al., 2015; Garbarino et al., 2019; Hartley et al., 2011; Thayyil et al., 2020; Violanti et al., 2006; Violanti et al., 2019). Further studies examined deeper the effects of stress on biological systems not typically explored in the clinical setting (Andrew et al., 2017; Baldwin et al., 2019; Baughman et al., 2015; Fink, 2020; Gu et al., 2018; Thayyil et al., 2020; Violanti et al., 2006; Violanti et al., 2018).

Occupational Stress and Family Relationships

In Tuttle et al.'s (2018) examination of the effects of occupational stressors on law enforcement marriages among 1,632 police officers, researchers highlighted the associations between organizational stressors such as job demand and work-family conflict. The researchers examined the spillover effects of emotional stressors which correlated with strained relationships. The stress of strained relationships further exacerbates existing problems for police

officers and may impact their health. The researchers determined that the pressure of law enforcement job demand and poor emotional health related to negative relationship status among law enforcement marriages (Tuttle et al., 2018).

Occupational Stress Coping Methods

Grego et al. (2018) studied the relationship between perceptions of physical and mental health stressors and stress management techniques of police officers. They found that police officers perceived fewer stressors and greater perceptions of wellbeing than the general population. This data aligns with Shiozaki et al. (2017) and Thayyil et al. (2018) research. Shiozaki et al. (2017) studied the behavioral characteristics, health, and perceptions of stress of 1,196 police officers. They found police officers in the study were less likely to perceive job stress but had higher levels of CVD risk factors. The Thayyil et al. (2018) study revealed police officers' perceptions of job stress and satisfaction were not mediators of the relationship between law enforcement work and physical fitness status. Police officers in the Thayyil et al. (2018) study had higher levels of poor physical fitness yet reported acceptable levels of stress, indicating a lack of awareness of their risks for cardiovascular disease. In assessing police officers' low perceptions of stress, Grego et al. (2018) point to the possibility of better-developed coping strategies and greater resilience among law enforcement. However, contradictory to Grego et al.'s (2018) suggestion, and as indicated by the HBM theory (Rosenstock 1966/1974) and Gendron et al. (2018), contradictions between perceptions of stressors and measured risk factors support the idea that other variables perhaps skew officers' perceptions of personal stressors, which affect their health behavior decisions.

Trauma, Physiological Reactions, and Psychological Impairment

In a systematic review of police stressors, Violanti et al. (2017a) examined frequent causes of stress for police officers and the related health outcomes, finding empirical correlations between causations of stress and the impact of such on police officers' health, and further demonstrating the cyclical effects of occupational stressors among law enforcement. The authors noted exposure to traumatic events often resulted in elevated stress levels among police officers. Trauma was associated with the physiological effects of hyperarousal and hypervigilance, biological reactions known to lead to cardiovascular irregularities (Violanti et al., 2017a). They also noted associations between such traumatic events and post-traumatic stress disorder (PTSD), which associates with other forms of psychological impairments such as suicide. Suicidal ideation was prevalent among male police officers with PTSD symptoms and evening shift hours. The authors also noted the potential for long-term or symptomatic delay of biological impacts of stress as brain structures change in response to trauma exposure (Violanti et al., 2017a). The study assessed police officers' perceptions of traumatic events and compromised psychological health symptoms; however, it did not include an assessment of their perceptions of susceptibility and severity of cardiovascular disease risk. Prior research by Thoen et al. (2020) revealed similar findings on police suicide; their study evaluated the prevalence and use of wellness programs focused on police officer wellbeing and suicide prevention. Results indicated that employee assistance programs were the most commonly implemented in law enforcement agencies, albeit inconsistently and not well established. Of the respondents in the study, 12.4% reported that it was "quite" or "very likely" that they would someday attempt suicide.

Purba and Demou (2019) conducted a systematic review of 15 studies to evaluate the relationship between organizational stressors of law enforcement work and police officer mental

health. The authors found that studies consistently captured associations between organizational stressors and depression, psychological problems, emotional exhaustion, depersonalization, and personal accomplishment. Not surprisingly, studies consistently found significant relationships between compromised mental health and lack of support, poor leadership, performance pressure, and long working hours (Purba & Demou, 2019), further demonstrating the importance of occupational stress management and positive social support among law enforcement. This data aligns with research by Houdmont (2017) and Chan and Andersen (2020b) that supports the concept that organizational stressors are just as impactful as operational stressors. The Houdmont report indicated several organizational stressors (such as bureaucratic frustrations, problems with leadership, and lack of social support) cause serious psychological harm to officers. The Chan and Anderson (2020b) study revealed a positive relationship between organizational stressors and psychological problems among police officers, which supported the concept that such stressors impact their health and well-being.

Strained Police-Community Relations

The current social climate warrants a critical examination of operational and organizational stressors affecting law enforcement officers and the communities they serve. In Minneapolis, Minnesota, in May of 2020, the death of George Floyd, a Black man, while in police custody, exacerbated an existing national controversy about purported police brutality against people of color. This event added to the current tensions between many law enforcement agencies and minority communities (Robinson, 2019). Given the high emotions associated with the incident, people rapidly disseminated information across the country, often suggesting police officers' indifference to the use of force and subsequent killing of someone (Robinson, 2019).

This incident compounded the "us versus them" mentality prevalent among many communities (Violanti et al., 2017; Robinson, 2019).

Incidents such as these create division among communities and impact people's confidence in the police, a critical yet complex component of policing (Morrell et al., 2020). James et al. (2020) pointed to variations in public opinion polls from before and after the death of George Floyd. In December 2014, respondents reported perceptions of confidence in the police approximately 8% more than similarly reported perceptions in June 2020. The authors further stated that a lack of use-of-force data reporting to the public generates mistrust (James et al., 2020). In their study of the worse stressors perceived among law enforcement, Violanti et al. (2016) revealed police officers ranked killing someone in the line of duty as the second worst stressor (they ranked first witnessing dead or battered children). Data such as this demonstrates police officers generally take their responsibilities concerning the use of force seriously.

Before the Minnesota incident, increased ambushes of police officers from 2014 to 2016 led to a "war on cops" thesis. Clifton et al. (2018) studied the coping effects of police officers in response to the tensions resulting from the ambushes and determined those police officers experienced deeper scrutiny and greater perceived threats of attacks. Research by White et al. (2019) suggested rejecting the "war on cops" theory given the historical data showing reduced threats to police officers and suggested law enforcement is safer than it was fifty years before due to improved safety in policing. However, the White et al. (2019) study also noted conceptualization of the dangerousness of policing must include factors such as suicide and heart attacks.

Adebile (2017) and Aita et al. (2018) noted that common questions arise concerning problem attribution and resolution. Adebile (2017) points to the tension, anger, and fear among

many communities and suggests the revival of Peelian principles of policing to establish common ground among stakeholders. Establishing common ground may be challenging with influential, biased media. Bejan et al. (2018) studied the impact of media influence on the general population and found social media significantly influenced public perceptions. By using data on the police use of force, police killed in the line of duty, and social media coverage, Bejan et al. (2018) analyzed retaliatory violence between police officers and citizens. Researchers found evidence of associations between police officers shot in the line of duty and the number of minorities killed on the same day. They also found associations between minorities shot by police officers and decreases in the number of police officers shot. The study also demonstrated significant associations between social media coverage and increases in the risk of fatal victimization of police officers and minorities (Bejan et al., 2018).

Blumberg et al. (2018) discussed the issue of police misconduct from a socio-cultural perspective, suggesting that police officers learn unethical behaviors via a traditional police culture that emphasizes disengagement from the public and compromises emotional intelligence. The authors point to the need for better police hiring practices, continuous specialized training, and wellness programs focused on emotional intelligence and community-oriented policing strategies (Blumberg et al., 2018). Violanti et al. (2018b) studied police officers' social avoidance and found that such was not surprising given the occupational cultural influences of law enforcement work. Blumberg et al. (2018), Ingram et al. (2018), and Violanti et al. (2018b) noted that the traditional police culture reinforces division between the police and the public.

Further, Nhan et al. (2019) noted that law enforcement has significantly changed in that the evolving demands of the profession include intense scrutiny of police officers. The latter was highlighted by Baldwin et al. (2019) in their caution against using research data for individual

assumptions on generalizable data. In their assessment of executive-level training programs for senior law enforcement officers, the Nhan et al. (2019) study suggested executive police training should also include continuing professional development and academic education to improve performance among senior-level police officers (Nhan et al., 2019).

It could be argued that stress associated with tense police-community relations profoundly impacts police officers and those they serve. Embroiled in literal and figurative battles with the people they swear to protect, officers may be rightfully frustrated by the circumstances of the current social conditions of their country. The high tensions and vacillating public opinions of the police (James et al., 2020) create additional pressure and stress for police officers. Compromised police-community relationships compound the traditional occupational stressors of law enforcement, potentially affecting police officers' psychological and physical health.

Police Officer Perceptions of Stressors

Violanti et al. (2016) studied 365 police officers to determine the highly rated stressors among the law enforcement population. The authors measured the officers' prevalence, frequency, and rank of stressors. They determined the top five stressors reported were exposure to battered or dead children, killing someone in the line of duty, having a fellow officer killed in the line of duty, involvement in a situation requiring the use of force, and being physically attacked (Violanti et al., 2016). The top five occurring stressful events, however, were: dealing with family disputes, responding to a felony in progress, fellow officers not doing their job, making critical, quick decisions, and having insufficient human resources (Violanti et al., 2016). Therefore, while some events may be more stressful than others, such events are rare occurrences.

The Violanti et al. (2016) study determined the highest-ranking stressors of police officers, although there was no determination of the subsequent effects on the officers. However, the study indicated the psychological impact of specific stressors on law enforcement officers, suggesting the importance of available support for dealing with occupational stressors. Additionally, the data reflected the importance of social support among law enforcement. This study demonstrated that a lack of social support is directly related to increased health problems, such as cardiovascular disease among law enforcement officers (Violanti et al., 2016). Although the study demonstrated a potential mediator (social support) of stress and health problems, it did not evaluate police officers' perceptions of their cardiovascular disease risk.

In their study, Greco and Fischetti (2018) investigated perceptions of the stress of law enforcement officers compared to the general population. Results indicated that police officers perceive less pressure than the general population and attributed such to police officer resiliency often learned through the early police academy and advanced training. One hundred and one law enforcement officer participants completed questionnaires measuring psychosocial stressors, physical health, and mental health in this study. The analysis revealed significant statistical differences between sources of stress and coping strategies. Although this research indicates strong resiliency associated with law enforcement work, there is also the possibility that perceptions of stressors may contrast with the health profiles of the participants. For instance, there is the possibility that officers utilize greater coping strategies and thus demonstrate improved resiliency to stress. However, there is also the possibility that officers may consciously or subconsciously inaccurately report fewer perceptions of stress due to external factors such as the culture of invincibility common in police work. Or perhaps participants are less willing to disclose occupational stressors given the fear of stigmatization, as noted in studies by Haugen et

al. (2017) and Stuart (2017). In their systematic review of law enforcement officers' mental health barriers to care, Haugen et al. (2017) found that the primary obstacle to psychological intervention among law enforcement officers was fear of stigmatization and its perceived potential impact on their careers. A police officer's active or subconscious unwillingness to report mental health concerns may mirror their reluctance to acknowledge or mitigate physical health concerns. Similar findings by Stuart (2017) reflected police officers' fear of stigmatization by their peers. Although research by Greco and Fischetti (2018) and Haugen et al. (2017) bridged a gap in understanding stress among law enforcement compared to the general population, neither study compared the perceptions of stress among police officers with their physical health profile, leaving a current gap in the literature.

Metabolic Syndrome—Standard Measurements of Cardiovascular Disease Risk

Metabolic syndrome (Met Syn) is a known group of risk factors that increase the risk of cardiovascular disease (AHA, 2021). A metabolic syndrome diagnosis includes three or more of the following elements: 1) abdominal obesity, which measures waist circumference greater than 40 inches and 35 inches in men and women, respectively; 2) triglyceride level at or greater than 150 milligrams per deciliter of blood (mg/dL); 3) HDL cholesterol of less than 40 mg/dL and 50 mg/dL in men and women, respectively; 4) systolic blood pressure of or greater than 130 millimeters of mercury (mm Hg) or diastolic blood pressure of or greater than 85 mm Hg; 5) fasting blood glucose of or greater than 100 mg/dL (AHA, 2021). The risk of metabolic syndrome increases as the presence of each component increases, leading to an increased risk of cardiovascular disease (AHA, 2021). While there is some controversy over the precision of a metabolic syndrome diagnosis (Virani et al., 2021), the consensus among practitioners relies on its concepts for predictive assessment of cardiovascular risk (Schaffer & Dobkowski, 2020).

Cardiovascular Disease Risk Factors Among Police Officers

In a study by Gendron et al. (2018), researchers assessed the cardiovascular health of 2,099 police officers. They found that two traditional cardiovascular disease risk factors, obesity, and hypertension, were higher among male police officers than in the general male population. Research conducted by Keeler et al. (2021) revealed similar results when their study demonstrated a correlation between two factors (obesity and hypertension) and arterial stiffness (a predictor of CVD) among study participants. The Keeler et al. (2021) data also revealed in male law enforcement officers, greater arterial stiffness increases throughout their careers compared to the general population. In the Gendron et al. (2018) study, however, females had lower traditional cardiovascular disease risk factors compared to the general population. Overall, a high proportion of male and female police officers were in a moderate to high-risk category of cardiovascular disease. The authors point to job strains on lifestyle choices among law enforcement officers affecting their health behaviors (Gendron et al., 2018). The authors suggested training aimed at physical and psychological wellness to reduce the risk of cardiovascular disease-related problems. Despite finding cardiovascular disease risk factors among the participants, researchers did not study participant perceptions of risks and mitigation behaviors.

Another study by Meena et al. (2018) evaluated the health profiles and health behaviors of 300 police officers in India. The cross-sectional study administered a survey to participants and reviewed their self-provided health records. An astounding 49.6% of participants reported health concerns, with the most common related to cardiovascular, musculoskeletal, and gastrointestinal issues; approximately half of the affected participants utilized treatment. Controlling for age, gender, rank, and education, the researchers also found relationships

between occupational stressors and poor lifestyle choices and relationships between poor lifestyle choices and health problems. The most prevalent health concerns reported were cardiovascular issues (36.2%). The researchers pointed to multiple factors attributing to poor health behaviors, including a lack of awareness and dependence on informal intervention methods such as seeking peer advice and self-medication. Although the data from this study may not be generalizable to police officers in the United States, there are many similarities in roles, responsibilities, and inherent psychological stressors among the different populations. While there are limitations to the Meena et al. (2018) study, including a lack of a control group and no clinical assessment of health profiles, the data indicated the need for education based on prevention, mitigation, and treatment options for physical and psychological impairments correlated with law enforcement work.

Thayyil et al. (2020) determined that law enforcement officers in the study had a high risk of developing cardiovascular diseases due to the prevalence of risk factors found among this population sample. The researchers also found other prevalent cardiovascular disease risk factors among the police officers, such as high body mass index (BMI), smoking, and alcohol use. Smoking and alcohol use, predictors of cardiovascular disease risk factors (AHA, 2021), are lifestyle behaviors commonly adopted among law enforcement officers as coping skills (Clifton et al., 2018; Garbarino et al., 2015). Despite everyday awareness of the adverse health effects of smoking and alcohol use, many police officers self-medicate with these behaviors to escape from the stressors of law enforcement (Clifton et al., 2018; Thayyil et al., 2020; Violanti et al., 2017). Data from the Thayyil et al. (2020) study align with a study George et al. (2017) conducted assessing the cardiovascular risk of law enforcement officers. In their cross-sectional study, the authors evaluated the physical health profiles of 60 police officers. Results indicated over 73%

had a high BMI, over 63% had large waist circumference, 5% were diabetic, 85% consumed unhealthy foods, almost half (48.5%) had inadequate physical activity, and the overall prevalence of smoking and alcohol use were 15% and 20%, respectively.

Furthermore, their data revealed an alarming 85% had at least two or more metabolic risk factors. The researchers applied the Framingham Risk Score (FRS) method to predict cardiovascular disease risk (Farhangi & Jahangiry, 2020). The data revealed that 40% of the participants had an elevated FRS, and all of the participants had at least one cardiovascular disease risk factor (George et al., 2017). This study revealed an alarming prevalence of CVD risk factors among law enforcement officers and pointed to the need for routine CVD screening and targeted health education.

Body Composition and Physical Fitness

Violanti et al. (2018) studied the association between body fat percentage and physical fitness among police officers. Noting the frequent sedentary activity with bursts of physical exertion, Violanti et al. (2018) highlighted the importance of healthy physical fitness for law enforcement officers. The researchers found that body fat percentage is inversely associated with physical fitness levels in police officers. Further, the research indicated police officers with higher body fat percentages had lower cardiorespiratory functioning, less strength, and less flexibility. This research corroborates existing data on the importance of physical wellness; however, this study did not evaluate police officers' perceptions of cardiovascular disease about their physical fitness.

Data from Mücke et al. (2018) and Schilling et al. (2019) support the potential mediating effects of physical activity on the health of police officers. Mücke et al. (2018) conducted a systematic review of studies involving the impact of regular physical activity and cardiovascular

fitness on stress reactivity. Results from their analysis identified physical activity associated with reduced subclinical markers of cardiovascular disease (cortisol and heart rate reactivity) in almost 60% and just over 40%, respectively, of the studies, as well as associations between higher physical activity levels and psychosocial stress responses in nearly half of the studies. Schilling et al. (2019) assessed 980 police officers on their self-reported stress levels and clinical measurements of metabolic syndrome components. The research indicates high cardiorespiratory fitness is associated with lower cardiovascular disease risk factors, mediating the effects of occupational stressors, cardiovascular risk, and mental health (Schilling et al., 2019). Again, police officers' engagement in physical activity may result from perceived risk; however, other external variables may affect their decision to engage in it. The study excludes data on their specific perceptions of cardiovascular disease risks. Additionally, data from Vuković et al. (2019) also support the significance of the relationship between physical fitness and the body composition of police officers. Vuković et al. (2019) indicated physical activity is associated with improved body composition among their participants.

Metabolic Syndrome and Psychological Health

In their study of 234 police officers, Garbarino et al. (2015) found elevated stress levels among police officers and increased numbers of metabolic syndrome risk factors. Their study demonstrated associations between psychological trauma, such as depression and PTSD, associated with violence and metabolic syndrome. The researchers also noted other independent and combined causal factors such as diet, lifestyle, adverse effects of shift work, and sedentary activity, suggesting the complex, cyclical factors contributing to higher cardiovascular risk. In contrast to other studies (Magnavita et al., 2019), this research demonstrated police officers' acknowledgment and awareness of stress as a significant risk within law enforcement. However,

the study did not reveal perceptions of understanding of cardiovascular risk. The researchers acknowledged such limitations, as well as the small sample size and a lack of a control group. However, the study was homogenous, allowing some generalizations across the law enforcement population.

Metabolic Syndrome and Shiftwork

In a follow-up to their original study, Garbarino et al. (2019) assessed the mediating effects of the relationship between occupational stress and metabolic syndrome among law enforcement officers. The researchers found a reciprocal relationship between job stress and sleep problems, pointing to the likelihood of the latter resulting from shift work, an inherent feature of law enforcement. This study confirmed previous findings of the high prevalence of metabolic syndrome among police officers and demonstrated the necessity of intervention via stress management as well as good sleep habits. This study measured perceived stress levels among police officers compared to sleep quality; however, the study did not measure perceived levels of risk of cardiovascular disease among participants.

The Buffalo Cardio-Metabolic Occupational Police Stress Study

Before Violanti et al. (2020) examined associations between law enforcement work and cardiovascular disease-related risks, Violanti et al. (2006) conducted a landmark pilot study (Buffalo Cardio-Metabolic Occupational Police Stress) (BCOPS) of 100 police officers integrating psychological, physiological, and subclinical measures of stress, disease, and mental health of police officers. The researchers demonstrated that police officers in this study had elevated risks of cardiovascular problems, and the study set the foundation for a methodology for future research.

In the original BCOPS study, Violanti et al. (2006) measured known biomarkers of stress: salivary cortisol levels, flow-mediated dilation (FMD), carotid intima-media thickness (IMT), depression, and post-traumatic stress disorder (PTSD). The BCOPS study revealed a significant percentage of police officers had increased cortisol awakening response (CAR) levels compared to the general population. Cortisol awakening response is a function of the hypothalamic-pituitary-adrenal (HPA) axis, which is responsible for cortisol (stress hormone) output and secretion (Chan & Andersen, 2020a; Violanti et al., 2006). When cortisol and other hormones are released into the body via the HPA axis, the body prepares for the "fight or flight" response. This biological response also leads to physiological reactions that suppress the immune system and change metabolic functions, which allow the body protection from the threat (Planche et al., 2020). Cortisol provides a negative feedback loop in this protective process, communicating with the HPA to continue or stop the stress response. Over time, the response increases the allostatic load on the parasympathetic nervous system, causing dysregulated cortisol levels frequently seen among police officers (Andrew et al., 2017; Chan & Andersen, 2020a). Although the BCOPS study evaluated the relationships between perceptions of stressors and CAR, the study did not evaluate perceptions of cardiovascular disease risk susceptibility among participants.

Using data from the BCOPS study, Hartley et al. (2011) examined health disparities among law enforcement officers compared to the general population. The authors found that police officers in the study had more traditional and non-traditional cardiovascular disease risk factors than the general population (Hartley et al., 2011). However, the study did not include police officers' perceptions of their cardiovascular health. Following the Hartley et al. (2011) study, Violanti et al. (2013) conducted a study of 2,800 police officers to examine life

expectancy compared to the general population. This study determined that male police officers had an increased risk of premature death and an increased probability of death than males in the general population (Violanti et al., 2013).

Measuring Subclinical Risk Factors

Subclinical Risk Factors, Body Composition, and Psychological Health

Later research by Violanti et al. (2019) also revealed increased flow-mediated dilation (FMD), carotid intima-media thickness (IMT), body mass index (BMI), and reported depression and PTSD among the participants compared to the general population. Flow-mediated dilation assesses brachial reactivity via measurement of vasodilatory responses to assess endothelial functioning and may associate with stress and cardiovascular risks among law enforcement (Violanti et al., 2006; Violanti et al., 2019). Carotid-intima media thickness (IMT) assesses arterial thickness by measuring areas where lesions and atherosclerotic plaque commonly occur (Violanti et al., 2006). Elevated FMD and IMT indicate greater dysfunction of cardiovascular systems and, in conjunction with increased BMI and psychological problems, suggest an increased risk of cardiovascular disease. Again, this study demonstrated relationships between physiological responses to stressors of police officers; however, not included were police officers' perceptions of their physiological reactions.

Shiftwork, Body Composition, and C-Reactive Protein

Because BMI frequently correlates with obesity, specifically high abdominal fat, practitioners often use BMI as an indicator of risk for cardiovascular disease. Conversely, body mass index (BMI), although a concern when considered among the group classification of risk factors, may be unreliable, as some practitioners refute the BMI single classification due to more

muscle mass than fat (Thayyil et al., 2020). However, BMI and other combined risk factors present concerns (AHA, 2021; Schaffer & Dobkowski, 2020).

In the Holst et al. (2019) study, researchers relied on existing data suggesting an association between shift work and inflammatory markers, which increases cardiovascular disease risk. By assessing BMI, the researchers examined the association between shift work in law enforcement and cardiovascular disease risk factors. They attempted to explain the relationship between shift work and the cardiovascular health of 360 police officers in the BCOPS study (Violanti et al., 2016) by examining inflammatory markers, including c-reactive protein (CRP), among evening shift workers with higher BMI. This study demonstrates the effects of shift work on police officers and the importance of a healthy BMI. Previous research by George et al. (2017) also revealed a higher BMI (73%) of study participants (police officers), which researchers also evaluated for individual and aggregated cardiovascular risk factors. However, although these studies utilized anthropometric data indicating cardiovascular health profiles, these studies did not include the assessment of participant perceptions of their cardiovascular health.

The Cortisol Awakening Response

The potential association between metabolic syndrome and CAR among law enforcement aligns with data from a study by Violanti et al. (2017b) and Chan and Andersen (2020a), which analyzed the effects of perceptions of stressors on the cortisol awakening response (CAR) of participants. The authors found that law enforcement stressors affect the officers' CAR; they noted a negative association between the stressors and the slope of the CAR. Additionally, the authors pointed out that the most stressful events lead to lower CAR over time, indicating a correlation between HPA dysfunction and cardiovascular disease (CVD) among law enforcement

(Chan & Andersen, 2020a; Violanti et al., 2017b). Although the study provided evidence of a relationship between metabolic dysfunction and CVD among participants, it did not examine police officers' perceptions of their cardiovascular disease risk.

The Cortisol Awakening Response and Shiftwork

Utilizing the BCOPS data, Fekedulegn et al. (2019) assessed the impact of leisure time activity on the relationship between sleep quality and the CAR. Researchers evaluated 275 police officers from the original study to compare data on self-reported measurements of sleep quality and off-duty physical activity with cortisol levels clinically measured. The study results demonstrated a significant effect on the relationship between leisure-time physical activity and sleep quality among the officers, suggesting the importance of promoting physical activity interventions among the law enforcement population. While the research indicates police officers' engagement in physical activity results from perceptions of health risk, there is no data on their perceptions of the risk of cardiovascular disease relative to their level of physical activity.

The Cortisol Awakening Response and Flow-Mediated Dilation

Violanti et al. (2018) examined 276 police officers on the association between CAR and changes in FMD over seven years. The researchers noted a significant decline in FMD in all participants over time. However, they also acknowledged that CAR alone might not affect FMD; instead, other factors like lifestyle and pathological health histories may lead to FMD dysfunction (Violanti et al., 2018). Nonetheless, the researchers found dysfunctional CAR and impaired brachial artery FMD associated with higher levels of cardiovascular disease among male participants, again shedding light on differences between male and female police officers. The researchers pointed to the possibility of different coping skills and strategies and potential

biological differences between men and women; however, the study did not examine police officers' perceptions of their susceptibility to cardiovascular disease risk. Additionally, the researchers pointed to different types of stressors unique to law enforcement work, such as frequent exposure to violence and trauma, that may blunt the cortisol responses of police officers.

The Cortisol Awakening Response and Heart Rate Variability

In their study of police stress and physiological responses, Baldwin et al. (2019) measured the heart rate variability (HRV) of 64 police officers for the duration of a call for service via stress activity mapping. The HRV measurement is believed to capture changes in the involuntary stress responses of the autonomic nervous system and can be an effective tool for measuring stress responses (Kim et al., 2018). However, measurement of HRV during real-world police situations, when officers are moving, often leads to inconsistencies and errors in the data (Heathers & Goodwin, 2017). Baldwin et al. (2019) averaged HRV across time. They tracked participants' physical movements to differentiate whether HRV resulted from physical or psychological stressors. The results of their study indicate that independent of incidental factors, HRV increased at specific points during the call for service, with peaks beginning at the time of dispatch, while enroute to the call, when on the scene, and to the point of encounter with a subject and any use of force. Certain factors (an active or anticipated threat of a weapon, for example) also influenced the HRV of the officers. Additionally, physiological arousal occurred independently of age, years of service, and training. However, consistent with findings from other studies (Chan & Andersen, 2020a), the researchers found that tactical officers experienced higher arousal rates than frontline officers. This study contributed to the growing literature on the

involuntary stress responses of police officers. This study did not include information on officers' perceptions of said responses nor their health behaviors related to such.

Cardiac Vagal Control

Andrew et al. (2017) also conducted research based on data from the BCOPS Study. The researchers studied the effects of cardiac vagal control (CVC) on police officers. Cardiac vagal control is a biological response to stress considered a significant marker of system functioning; associated with low vagal control are higher levels of psychological issues, inflammation, metabolic syndrome symptoms, and CVD (Andrew et al., 2017). Among the 360 police officers studied, there were no associations between occupational stress and CVC among male police officers; however, among female officers, the authors found that lower vagal control was inversely associated with a lack of organizational support. Such data corroborates potential differences among males and females in law enforcement noted in other studies (Farhangi & Jahangiry, 2020; Purba & Demou, 2018; Violanti et al., 2019) but also highlights the suggested importance of social support as a means of intervention among the law enforcement population (Clifton et al., 2018; Dennison et al., 2018; Purba & Demou, 2018; Violanti et al., 2016).

Retinal Vessel Diameter and Hypertension

Retinal vessel diameter measurement examines adverse changes associated with cardiovascular disease risk factors (Gu et al., 2018). In their study, Gu et al. (2018) researched the retinal vessel diameter (RVD) of BCOPS participants to assess the correlation between hypertension and CVD risk. The researchers noted the prevalence of hypertension among police officers and their lack of awareness, treatment, and management. The research indicated that law enforcement officers with uncontrolled or untreated hypertension had significantly lower retinal vessel diameter than officers with no or controlled hypertension, implying an increased risk of

cardiovascular disease among participants. Although Gu et al. (2018) studied perceptions of susceptibility and health behaviors regarding hypertension, the study did not precisely measure police officer perceptions of cardiovascular disease risk and mitigation.

Similarly, in their study on the relationship between cardiovascular disease and retinal health, Long et al. (2021) found significant associations between patients with cardiovascular disease and increased ischemia perivascular lesions (RIPLs). Their study evaluated the health records of 160 individuals with (n=84) and without (n=76) cardiovascular disease who had undergone macular scanning for RIPLs. The authors, noting that individuals with cardiovascular disease have increased odds of developing retinal problems, examined the relationship between the two variables. Their study revealed a positive relationship between the number of RIPLs and cardiovascular disease. They indicated a higher number of RIPLs were associated with higher odds of cardiovascular disease. The authors suggested that such a non-invasive, inexpensive scanning could supplement the identification of at-risk cardiovascular disease patients.

Diurnal Salivary Cortisol

Planche et al. (2019) analyzed the diurnal salivary cortisol (DSC) of 57 police officers compared to the general population. Diurnal salivary cortisol is a measurement of cortisol from awakening throughout the day (Chan & Andersen, 2020a; Planche et al., 2019). Cortisol production among healthy individuals increases upon wakening and decreases throughout the day; thus, a typical pattern indicates the ability to return to homeostasis following a stressful event (Planche et al., 2019). The researchers revealed that among the participants in the study, DSC was higher among tactical police officers than frontline police officers. Among the general population, DSC was higher among tactical and frontline officers. This study indicates occupational stressors may impact cortisol responses among police officers, leading to potential

causes of cardiovascular risk; however, the study did not include an evaluation of police officers' perceptions of risk. Chan and Andersen (2020a) followed up on the Planche et al. (2019) study to analyze the types of stress reported by tactical versus frontline officers. Their research showed differences between the primary types of stress between the subtypes of officers. The study also revealed that frontline officers reported more overall subjective stress than tactical officers, indicating that many officers' perceptions of stress do not always align with their actual stress profiles (Chan & Andersen, 2020a).

Cardiovascular Disease Interventions for Law Enforcement

Research indicates the high prevalence of cardiovascular disease-related injury and death of police officers. It suggests mitigation of such via improving physical fitness activity and nutrition, stress management, transparent patient-physician relationships, and cardiovascular assessments. In a study to analyze the effects of a health promotion program on CVD risk factors among blue-collar workers in Korea, Hwang and Kim (2019) implemented a participant-centered model that focused on lifestyle choices, CVD risk perception, family and social functions, and job stress. The researchers utilized an engaging method of study applying five factors of promoting health behaviors: establishing and planning goals, taking action, observing changes, reflecting on the impact of the actions, and analyzing results. This study revealed significant improvement in HDL cholesterol, weight, blood pressure, CVD risk perception, and health-promoting behaviors. The researchers noted improvements in LDL and total cholesterol, and fasting blood glucose; however, these elements were not statistically significant. The data also indicated increased family function; however, participants reported increased stress, and there were no differences in social support. After the program, participants initially classified as high risk for CVD were reclassified as low or moderate risk, which reduced the proportion of

participants in the high-risk group (from 40.6% to 21.9%). Additionally, unlike many other research-centered intervention models, this participant-driven study, which focused on participants' accountability and responsibility for their own decisions, indicated long-term predictions for success. Although this study has its limitations, including small sample size, a short observation period, and limited generalizability to other countries or populations, the data indicates that participant-driven health promotion programs could effectively reduce CVD risk among a specific population in smaller-scale workplace settings.

Other research by Taylor et al. (2021) and Williams and Ramsey (2017) aligned with the idea of wellness interventions aimed at health education, screening, physical activity, stress management, and lifestyle changes and pointed to increases in such among non-law enforcement agencies (e.g., corporate America) but limited availability among law enforcement. Law enforcement cardiovascular health and wellness programs have increased; however, in a systematic review of the availability of wellness programs for police officers, Taylor et al. (2021) found that mental health programs were the most common wellness programs offered. While this is excellent news for tackling the stigma of mental health that is often associated with law enforcement work, the death toll of police officers succumbing to cardiovascular disease indicates a need for physical wellness initiatives.

Benefits and Barriers of Cardiovascular Disease Interventions for Law Enforcement

The available research on cardiovascular disease risk interventions for the law enforcement population highlights the benefits of mitigation. The HBM theory indicates that perceptions of susceptibility and severity of cardiovascular disease among law enforcement may be valuable predictors of health behaviors to mitigate said risks. However, the HBM theory also suggests that the combination of perceptions of susceptibility and severity, along with

perceptions of benefits and mitigation barriers, produces accurate health behavior predictions. However, as the HBM and expectancy theories indicate, a health behavior action depends on the weight of the perceived benefits and barriers of such action. Theoretically, the probability of an action taken requires greater measurements of perceived benefits versus measures of perceived barriers. Therefore, an intervention aimed at reducing cardiovascular health concerns among police officers should include relevant information that collectively emphasizes and promotes the benefits of mitigation and curtails and reduces barriers to such.

Screening

Research indicates the importance of identifying cardiovascular disease risk factors and points to the concept that solutions often include lifestyle modifications and medicine (Hwang & Kim, 2019; Long et al., 2021). Studies suggest wellness programs should consist of cardiovascular health screening (Gonzalez et al., 2019; Violanti et al., 2018). Traditional health screenings for CVD typically include testing metabolic syndrome risk factors (AHA, 2021), and many police officers undergo such testing throughout their careers, whether independently or prompted by their employers. Traditional CVD screening creates awareness of the presence of symptoms subject to treatment potentially beneficial to the individual. However, often, there are no symptoms of cardiovascular disease solely identified via traditional testing (AHA, 2021), and, further highlighted by Pitts et al. (2015), many people who presented to the emergency room for a heart attack had cholesterol levels within the normal or near-normal range.

In their study of 100 Italian law enforcement officers, Brunetti et al. (2020) observed and evaluated participants' cardiovascular health. Researchers assessed participants for metabolic syndrome factors and conducted cardiovascular assessment via a remote telemedicine electrocardiogram (ECG/EKG). Researchers ranked the subjects on risk and evaluated

participants' reported health behaviors. The research team concluded that 22% of participants had a significant cardiovascular risk profile requiring prevention, and 66% showed intermediate risk levels. Similar to the data found in other studies (Farhangi & Jahangiry, 2020), males had a higher risk than females. The EKG data revealed that the majority of participants (57%) had typical EKG results; however, in 41% of cases, participants presented with minor abnormalities requiring non-urgent intervention. Two percent of the cases revealed urgent problems requiring immediate cardiovascular intervention; one case revealed an emergency requiring immediate medical intervention. Noting that control and awareness of cardiovascular risk are unsatisfactory among the Italian law enforcement population, the researchers discussed the potential benefits of telemedicine as it pertains to cardiovascular health intervention. Given the somewhat homogenous nature of police work, the results of this study are slightly generalized to American law enforcement officers as well.

Additionally, Sheinberg (2020) noted two specialized cardiovascular screenings available to police officers that provide an in-depth assessment of cardiovascular functioning. Such screenings include testing for blockages in arteries which captures evidence of contributing risk factors years before becoming a problem. A coronary calcium score test conducted via CT scan is a relatively inexpensive, non-invasive procedure that measures calcium in the arteries (which indicates blockage) of the heart and takes approximately 30 seconds to complete (Sheinberg, 2020). Sheinberg (2020) suggests pairing the coronary calcium score test with another non-traditional screen, the phospholipase A2 (LP-PLA2). The LP-PLA2 blood test also measures blockage by identifying inflammatory markers in the blood. Research suggests the LP-PLA2 test strongly predicts CVD risk among various populations and demographics (Li et al., 2017; Sheinberg, 2020; Wei et al., 2017; Younus et al., 2017; Zhang et al., 2020). Other potential non-

invasive, inexpensive testing includes retinal scanning, which can accurately identify patients with cardiovascular disease (Long et al., 2021). Given their high risk of cardiovascular disease, police officers are good candidates for specialized testing; however, data are lacking on the number of police officers undergoing such screening or even aware of it.

Some law enforcement agencies may offer free health screenings to officers via wellness programs or events. While some insurance plans allow for traditional and non-traditional testing (Tunis & Messner, 2017), the uncovered costs of cardiovascular health screenings may be a perceived barrier to undergoing such. Another perceived barrier to screening may be the police officers' fear of a diagnosis of CVD impacting the police officer's ability to work in the field; some police officers may perceive such disability as an unglorified way to leave the profession and, therefore, opt out of the screening. Individual perceptions vary among police officers, affecting their decisions to undergo standard and non-traditional screening for CVD; however, the lack of data on police officers' perceptions of their options warrants additional research.

Stress Management

Brunetti et al. (2020) cite stress as an invisible enemy of cardiovascular health. Given the inherent nature of law enforcement work, specific occupational stress and its effects seem imminent for police officers. There is a distinct relationship between occupational stress and cardiovascular health among law enforcement; thus, stress management is essential. In their review of stress management interventions for anxiety, PTSD, sleepiness, and fatigue among law enforcement officers, Lees et al. (2019) found evidence that educational interventions targeting occupational stressors, resiliency, and coping strategies impacted police officers. The Lees et al. (2019) study advanced the existing literature on interventions; however, the study did not include perceptions of risk related to cardiovascular disease among participants. Whereas the Lees et al.

(2019) research and other studies (Domes et al., 2019) demonstrated effective stress management interventions among the law enforcement population, one review (Collins et al., 2017) noted evidence that risk perception alone was not enough to reduce cardiovascular disease. Such evidence indicates the need for improved comprehension of the effects of physiological responses and methods of managing such, as well as additional research examining the impact of targeted cardiovascular disease interventions on the law enforcement population.

Dollard et al. (2019) researched factors of law enforcement stressors and found that organizational-level stress management interventions were more beneficial than individual-level stress management interventions; however, the former interventions were much more challenging to deliver. Galbraith et al. (2020) corroborated the Dollard et al. (2019) data in their analysis of over 700 police officers in a large United Kingdom police force. Their assessment of patterns of occupational stressors among police and dispatch personnel revealed that the lack of social and managerial support was a primary stress factor for participants. They further revealed the negative psychological and physical impacts of such stressors on law enforcement personnel. Additionally, the authors noted a shift from an authoritarian leadership model to a supportive model, reflecting a culture shift within policing. Studies such as this highlight the need for stress intervention and adequate and appropriate stress intervention explicitly targeted at law enforcement organizations.

Notably, the following studies examined the effects of physiological stress reaction education on police officers. Ramey et al. (2017) pointed out that stress management intervention occurring later in police officers' careers is often ineffective. Noting the ability to modify physiological stress responses, the researchers studied the effects of a resilience training program on a small sample of police academy recruits and determined the significant impacts of

such on the health of the police officers. Educating the cadets on the triggers and physiology of stress, how to modify their involuntary reactions to the stress, and control emotional responses to stress, participants exhibited improvement in resiliency coherence (Ramey et al., 2017).

Data from a study by Reingle Gonzalez et al. (2019) demonstrated the feasibility of using real-time physiological stress response measurements on police officers. Using a small sample of police academy recruits, researchers measured the compliance and reliability of a device measuring physiological stress responses and found the devices to be a feasible tool for improving police officers' awareness of biological reactions. Further, DeNysschen et al. (2018) research align with such studies, emphasizing the effectiveness of health and wellness within law enforcement. Their study of 51 law enforcement college students evaluated the health and wellness program's effects, including physical fitness, proper nutrition, and stress management. Results from the study indicate that wellness programs aimed at criminal justice graduates can prepare emerging police officers with a foundation in a healthy lifestyle.

The benefits of stress management are evident; however, as previously cited, several studies pointed to minimal perceptions of stress among law enforcement officers (Grego et al., 2018; Maran et al., 2018; Purba & Demou, 2019; Shiozaki et al., 2017; Thayyil et al., 2018) and incongruent perceptions of stress and cardiovascular profiles of police officers (Grego et al., 2018; Shiozaki et al., 2017; Thayyil et al., 2018). The potentially skewed perceptions of stress affecting individuals within the law enforcement population may parallel police officers' perceptions of their cardiovascular risk, which may be a barrier to mitigation. Thus, cardiovascular disease intervention must include specific multi-faceted training and education.

Physical Activity and Nutrition

There is empirical evidence (Virani et al., 2021) and consensus about the benefits of physical activity and proper nutrition for general health and wellbeing (Drogos et al., 2019; Kuehl et al., 2016; Wood et al., 2017; Wunsch et al., 2019). The unconventional working and eating hours of police officers may pose barriers to adopting healthy nutrition and exercise habits; however, research suggests the benefits of such (MacMillan et al., 2017; Sisti et al., 2018). In their review, Sisti et al. (2018) examined the effectiveness of lifestyle interventions on cardiovascular risk factors among high-risk groups. They noted interventions focused on increasing health behaviors known to reduce the risk of cardiovascular disease. The researchers found better results in primary prevention in moderate- to high-risk groups and noted the significant benefits of intervention aimed at diet and exercise. However, Sisti et al. (2018) did not include an examination of the relationship between police officers' perceptions of their CVD risk and their health behaviors. Other evidence (MacMillan et al., 2017) suggests similar findings of the positive effects of health interventions among law enforcement. In their systematic review of studies on the characteristics and impact of different health programs, researchers found that studies with tailored approaches yielded positive outcomes for the health and wellbeing of police officers. The most impactful of the studies consisted of those with a combination of peer support and behavior and structured support (MacMillan et al., 2017). Supporting research conducted by Gerber et al. (2018) assessed the associations between perceived stress, leisure-time physical activity (LTPA), psychological need satisfaction (PNS), and occupational burnout.

Highlighting the association between burnout and health issues, including cardiovascular disease risk factors, the researchers analyzed the buffering effects of LTPA on 306 participants. Their research revealed that perceived stress positively correlated with burnout and negatively

correlated with leisure-time physical activity and psychological need satisfaction. Participants with reported higher levels of LTPA and higher perceived stress reported fewer burnout systems. Additionally, the researchers found that LTPA as a stress buffer was relevant in participants with low psychological need satisfaction; participants with reported low levels of LTPA and low PNS and high stress reported the most burnout. Isoard-Gauthier et al. (2019) further contributed to similar findings on the moderating effects of physical activity on burnout and cognitive weariness. Their study revealed associations between stress and higher levels of burnout and moderating effects of physical activity on the relationship between stress and burnout. Such findings lend credence to the importance of healthier, physically active lifestyles.

Further, Maran et al. (2018) studied the effects of physical wellness courses taken by 105 police officers. At the end of the study, the researchers concluded increased perceptions of wellbeing, including mental health benefits, improved coping skills, and decreased maladaptive coping skills. This data aligns with other research; in their study of 201 police officers, Schilling et al. (2019) examined the effects of cardiorespiratory fitness on the relationship between occupational stress, cardiovascular risk, and mental health. The researchers found high cardiorespiratory fitness levels associated with lower cardiovascular disease risk and higher stress levels associated with poorer mental health (Schilling et al., 2019). This data increased the relationship between physical fitness and CVD risk among the participants; however, the study did not include participants' perceptions about their CVD risk. In a later study, Schilling et al. (2020) researched the relationship between physical activity and metabolic syndrome in police officers. Although the researchers found no significant associations between physical activity and work stress, they found higher physical activity and cardiorespiratory levels associated with lower metabolic syndrome variables (Schilling et al., 2020).

Kuehl et al. (2016) studied the effects of an intervention called the Safety & Health Improvement: Enhancing Law Enforcement Departments (SHIELD) on over 400 police officers. The SHIELD program focused on improved nutrition, physical fitness, body weight, sleep quality, and reduced maladaptive behaviors such as smoking and alcohol use. The researchers found the SHIELD program feasible and effective at six months at improving nutrition, sleep, and stress; long-term effects measured at 24 months indicated nutrition improvements (Kuehl et al., 2016). The Kuehl et al. (2016) study provided valuable evidence of the importance of wellness intervention; however, the study did not provide information about police officers' perceptions of their CVD risk.

Social Support

Thus far, the importance of social support is evident in the available literature. Police officers frequently seek social support from leadership and colleagues (Clifton et al., 2018), which serve as positive protective factors. Several studies suggest social support starts at the beginning of the police officers' careers (Blumberg et al., 2019) and at the top of an organization, where law enforcement leaders demonstrate significant trickle-down effects among their subordinate officers (McComas, 2018; Park & Hassan, 2018). Applying social learning theory (Bandura, 1977) in their study on the effects of empowering leadership in law enforcement, Park and Hassan (2018) suggested that lower-level police officers learn from observations of upper-level police officers. As powerful role models in their organizations, empowering leaders demonstrate social support to their officers.

Santa Maria et al. (2018) studied the role of job demands and resources on law enforcement officers' physical and psychological health, analyzing variables relating to the relationship between burnout and physical and mental health complaints. They also noted the

issues of depression and anxiety common in working populations and the close relationship between these two problems and burnout. The researchers found that job demands and stressors influenced the level of burnout experienced by the officers. This relationship affected the accurately predicted depression and anxiety of those officers. Notably, social support from colleagues and supervisors was negatively associated with psychological strain, indicating the need to strengthen said relationships (Santa Maria et al., 2018). This study revealed the association between occupational stressors and the health of police officers, including police officers' perceptions of stress and its effects on their reported health concerns. However, the study did not include information on the police officers' perceptions of their CVD risk.

A study by Dennison et al. (2018) assessed over 700 participants in their analysis of the effects of cardiovascular disease risk education on lifestyle behaviors. Researchers pointing to increased fruit and vegetable intake on improved cardiovascular health identified a positive relationship between higher social support and a higher probability of enhanced lifestyle changes. In contrast, higher stress correlated with a lower likelihood of lifestyle changes (Dennison et al., 2018). The study supports the concept of the HBM, as external sources (such as social support) mediate the relationship between CVD education and lifestyle behaviors.

As previously cited in this literature review, the Purba and Demou (2019) review called for social support interventions among police officers. While some research (Burke et al., 2018) points to the potential effects of a short-term peer support intervention for mental health concerns, other literature empirical evidence demonstrates the positive protective factors of peer support (Millard, 2020), administrative, and intimate support (Chae & Boyle, 2019; Karrafa & Thrasher, 2019; Marx, 2019). Additionally, Violanti et al. (2016) reflected on the importance of social support among law enforcement. Data from their study associated a lack of social support

with increased risk factors that may contribute to cardiovascular disease among law enforcement officers. Violanti et al. (2017) also emphasized the importance of social support to cardiovascular risk in their study that assessed the relationship between cultural factors common among law enforcement, health problems, and social support. The researchers determined lower social support was associated with higher social avoidance (Violanti et al., 2017), demonstrating potentially cyclical effects on police officers' health.

A Culture of Invincibility

The reviewed literature demonstrates the need for intervention aimed at the physical and psychological health and wellness of police officers. However, a potentially prominent barrier to any intervention among law enforcement may be a culture of invincibility. Analyzing a culture of invincibility within HBM theory suggests police officers perceive more significant barriers than intervention benefits. Batton and Wright (2019) point to the law enforcement culture of hypermasculinity promoting resilience and perseverance at all costs. Such traits are critical for survival, especially in life-or-death incidents where police officers must protect themselves and others. However, police officers may not recognize the impact occupational stressors have on their life—or their deaths. As noted by Clifton et al. (2018), the subculture of policing promotes maladaptive strategies. Viewing natural human emotional responses as weakness or failure, police officers may synonymize problem denial or rejection with resiliency and perseverance.

Police officers' perceptions of stress as involuntary, biosocial processes and their perceptions about their ability to manage such reactions may affect their health behaviors practiced. Given the prevalence of mental health stigmatization, in general (Tartaro et al., 2021), police officers may believe that their acknowledgment of psychological or physical concerns deviates from the expected toughness demanded by traditional police culture (Bullock &

Garland, 2017) and adopt maladaptive behaviors to reduce the dissonance. Conversely, police officers may altogether refuse or ignore cardiovascular disease intervention.

As noted by scholars (Ingram et al., 2018; Violanti et al., 2017), police officers are often suspicious, cynical, and hypervigilant by the nature of their work. Such traits may cause physical or psychological health problems for the officer and may negatively impact relationships (Clifton et al., 2018). A police officer's inability to separate from their law enforcement role off-duty affects personal relationships (Tuttle et al., 2018), reinforcing a culture of invincibility. Fauzan (2019) noted the challenges of organizational transformation in his study of participants' cynicism toward organizational changes. Fauzan (2019) found correlations between negative affect traits and cynicism about organizational change. Although implementing organizational changes among cynical law enforcement groups may be challenging, police officers cognitively rejecting a culture of invincibility may perceive greater benefits than barriers.

Maslow's Hierarchy of Needs Theory in Law Enforcement

Maslow's (1943) Hierarchy of Needs Theory (HNT) suggests a theoretical framework of human motivation based on a foundation of hierarchal factors. The primary foundation refers to basic physiological needs such as air, water, food, clothing, shelter, sleep, and sex. The next step relates to safety needs such as physical, financial, family, health, and property security. The middle stage refers to the need for love and belonging by others, including intimate partners, family, friends, and peers; the fourth step relates to conditions of self-esteem based on respect, status, recognition, and confidence. Finally, the final step refers to self-actualization of being one's best self and acknowledging individual characteristics (Maslow, 1943a; Raines, 2020). A sixth element, transcendence, was introduced later, based on the belief in a higher power than oneself (Raines, 2020).

For many police officers, the hierarchy of needs becomes compromised at the inception and throughout their careers. The demands of shift work have an influence on eating schedules, sleep quantity and quality, and intimate time with partners. Safety needs get compromised during critical incidents and when they develop health problems in response to operational and organizational stressors. Such job demands and outcomes also impact relationships with others, thereby affecting one's sense of belonging. As occupational stressors continue and problems worsen, self-esteem and self-actualization become irrelevant to the other unmet needs. The saving grace for many police officers is the seventh component of the hierarchy. Although the transcendence element was not widely accepted (Raines, 2020), recent studies suggest spirituality positively affects the wellbeing of police officers (Blumberg et al., 2018; Clifton et al., 2018; Zavala & Curry, 2017) and the communities they serve (Robinson, 2019).

A Christian Perspective

In their study of problematic alcohol consumption by police officers, Zavala and Curry (2017) found police officers use prayer as a coping method. The research indicated police officers with greater levels of religious coping were less likely to report alcohol abuse; however, in this study, religious coping was not a mediator of the relationship between critical incidents and alcohol abuse (Zavala & Curry, 2017). Clifton et al. (2018) noted similar data in their study that found that police officers who relied on social support and self-help methods also reported using prayer as a coping method. Blumberg et al. (2018) discussed spirituality as a mediator of law enforcement stressors and the latter's impact on physiological factors. The authors also pointed to other studies that found ethical decision-making associated with spirituality (Blumberg et al., 2018). Chopko et al. (2016) found no significant effects of spirituality on police

officers' health risk factors or perceived stress. They found positive associations with spiritual growth and distress.

Spirituality is certainly not synonymous with Christianity; however, this terminology encompasses a broad definition of the element of transcendence in the hierarchy of needs. The associations between the beneficial use of prayer should not be surprising to Christians as scripture says, "Do not be anxious about anything, but in every situation, by prayer and petition, with thanksgiving, present your requests to God. And the peace of God, which transcends all understanding, will guard your hearts and your minds in Christ Jesus" (*New International Version Bible*, 1973/2011; Philippians 4:6-7). Further, the bible instructs believers to rely on Christ during hard times: "Be strong and courageous, do not be afraid or discouraged. For the Lord your God will be with you" (*New International Version Bible*, 1973/2011; Joshua 1:9). In such processes, Christian growth is imminent.

Christian scholars may also consider the paradox between cardiovascular disease prevention and death acceptance. As written in the Holy Bible, "There is a time for everything, and a season for every activity under the heavens: a time to be born and a time to die" (*New International Version Bible*, 1973/2011; Ecclesiastes 3:1-2), perhaps leading some to wonder if prevention matters if death is predetermined. Maybe these concepts exist among the many police officers suffering and dying from cardiovascular disease; in such cases, even the most extraordinary perceptions of susceptibility and severity may have a limited impact on their health behaviors. However, believing the scriptural suggestion that our "bodies are members of Christ himself" (*New International Version Bible*, 1973/2011; 1 Corinthians 6:2), taking care of the body honors God. Furthermore, staying healthy allows for better peacekeeping, undoubtedly a sacrificial task for police officers. Perhaps this is why we call them blessed.

Summary

Ample literature indicates law enforcement officers are highly susceptible to cardiovascular disease and associated risk factors. Such susceptibility is likely due to occupational stressors related to law enforcement work. Such stressors have significant psychological and physical effects on the human body, impacting police officers in various ways. The literature also strongly suggests specific interventions aimed at traditional and non-traditional screening for cardiovascular disease and cardiovascular disease risk factors, stress management on emotional health and resilience, physical health and wellness aimed at nutrition and physical activity, and peer support.

Whereas the available literature includes an abundance of studies examining police officers' perceptions of stress and their clinical cardiovascular disease risk factors, there is limited literature on associations between officers' perceptions of their cardiovascular health and their health behaviors (Saffari et al., 2020). Additionally, there is limited literature on the availability and accessibility of educational intervention aimed at increasing awareness of the susceptibility and severity of cardiovascular disease and the benefits and barriers to reducing such for law enforcement officers.

As indicated by HBM theory, one's perceptions of susceptibility to developing and severity of a health problem, combined with their perceptions of benefits and barriers and other demographic factors and cues to action, influence their health behaviors. The goal of this study was to fill a gap in the literature by identifying police officers' cardiovascular health perceptions and behaviors. Furthermore, another goal was to provide opportunities for targeted cardiovascular disease intervention among this population.

CHAPTER 3: RESEARCH METHODS

Overview

This section outlines the study's methodology, including its purpose, design, and procedures. The researcher conducted a qualitative case study exploring law enforcement officers' perceptions, mitigation, and education regarding cardiovascular disease. Despite growing evidence of a significant risk of cardiovascular disease and death among law enforcement officers, as well as increases in wellness programs among this population, there is not enough information available about whether law enforcement officers are aware of the high risk of cardiovascular disease among law enforcement and how they mitigate such. Therefore, interventions may be futile without adequately understanding the complexities of the problem. Changing social conditions and demands for police legitimacy over the last few decades parallel the growth of the talk of evidence-based policing (EBP) (Cherney et al., 2019) and call for more data-based interventions among this population. Therefore, before implementing any form of intervention for a problem, policymakers should have a comprehensive understanding of the targets of the intervention. One way of gaining such an understanding is by asking and including those directly affected by the problem. This qualitative, exploratory case study captured this kind of approach.

Research Design

The proposed qualitative case study explored non-archival data in the search for thematic correlations between law enforcement officers' perceptions, mitigation, and education regarding their cardiovascular disease risk. The research required new data because most literature on cardiovascular disease among law enforcement does not include officers' perceptions of awareness of their risk or their specific mitigation of such. Nor does the research indicate

standards of law enforcement officer exposure to cardiovascular health education. Additionally, understanding people's perceptions requires acquiring information, which further warrants collecting new data in this study. Via interviews with participants, the researcher explored law enforcement officers' perceptions of their cardiovascular disease risk, their reported health behaviors, and contributing factors.

Evidence-Based Practices

Recent increases in demands for police reform based on evidence-based policing (EBP) practices align with the construction of improving physical and mental health and wellness for law enforcement officers. Some studies suggest that unethical police behaviors coincide with police well-being (Blumberg et al., 2018; Blumberg et al., 2020; Papazoglou & Chopko, 2017). Evidence-based practices in social science rely on scientific research and rigorous methods of testing (Cherney et al., 2019). Largely positivistic, EBP relies on testable and evidentiary practices highly concentrated in the natural sciences (Lumsden, 2017). Additionally, from a perspective similar to medical science, social science practices also emphasize the Hippocratic oath to do no harm on many levels (Sherman, 2020). First, the role of service to others contradicts harm. The law enforcement officer's duty to serve others demonstrates the common understanding of their role in limiting damage to self, others, and the communities they serve. However, officers contradict that oath when their forced reactions to an offender's dangerous behavior result in harm to the offender. Thus, a modified code for law enforcement officers emerged, which centers on limiting or reducing the amount of damage to others (Mitchell and Lewis, 2017). However, this modified code is not a novel concept to law enforcement officers, as most basic training and practices include education and standards for limiting and reducing the amount of harm to others. Lastly, although most officers take their oath seriously to limit harm to

others, the literature surrounding the increased risk of cardiovascular disease and death among law enforcement officers suggests they may not restrict harm to themselves.

Although EBP practices have increased over the last few years, literature also suggests law enforcement officers' resistance to EBP. Lumsden (2017) conducted semi-structured interviews with 15 participants over about one year and found police officer resistance to EBP might result from officers believing it more of a trend than a policy. A study by Koziarski and Kalyal (2020) pointed to similar suggestions; their research highlighted police officer resistance to EBP might result from upper-level administrators displaying impulsive reactions to problems, thus causing frustration for lower-level officers. Another argument towards the opposition of EBP is that police experiences *are* evidence, leading scholars to delve into the subject from a research standpoint.

Fleming and Rhodes (2018) explored police officer knowledge based on experience and intuition in their qualitative study. The authors noted that "evidence" can take on different forms, and thus practitioners and scholars may benefit from a combination of such. Identified themes of this study include the highlight of cultures within law enforcement organizations, personal knowledge of the geographic areas of jurisdiction, and history of experience as law enforcement officers. Similar to the results from the Koziarski and Kalyal study (2020), there were indications of police officers' perceptions of research-based methods as "trends" rather than credible solutions to problems. Just as in the former studies, research by Jonathan-Zamir et al. (2019) mirrored similar outcomes reflecting the weight placed on personal experiences. The authors point to the emotional and cognitive responses of police officers as potentially a more reliable form of experience as evidence rather than research-based evidence; clearly, a problem evolves from contradictions between lived experiences and theoretical ideas or evidence suggesting

alternative methods. After all, police officers are those actually doing the police work. As noted in the Fleming and Rhodes study (2018), participants identified the importance of local knowledge based on their lived experiences and reliance on common-sense principles. Emerging from the theme of resistance to EBP is an emphasis on the strong influence of police education and training, police culture, and police experience. Factors such as these are quite necessary for qualitative examinations of problems; therefore, scholars must identify the appropriate balance in their research methodology.

Often within the social sciences, there is a demand for reliable, "hard" data produced by quantitative methods. Baskarada and Koronios (2017) discuss differing viewpoints on existing differences between the natural and social sciences. They point to the importance of various research methods in social inquiry and note that, although quantitative methods tend to dominate social science research, qualitative methods have their place in social science. Thus, there are several benefits of conducting qualitative studies in social science. Whereas quantitative studies focus on obtaining data for statistical analysis, social science research often relies on mixed methods or a qualitative approach (Baškarada & Koronios, 2018). Qualitative studies allow researchers to immerse themselves in the data by describing, exploring, and examining issues (Clark & Foster, 2017; Luciani et al., 2019).

Case Study Methodology Decision and History

Social scientists must carefully decide which qualitative methodology they will employ in their studies. The researcher may approach their study via a case study design where they collect detailed data about a particular phenomenon via observation, interviews, or surveys (Clark & Foster, 2017). Or they may opt for an ethnographic study where they engage and learn about a specific group of people by submerging themselves into the culture of the people or

group. They may choose a phenomenological approach if they intend to investigate a particular phenomenon's theoretical basis and intricacies. The researcher uses a grounded theory design to form new concepts or theories. Some studies require an action research design where subjects actively participate in programs. Often, qualitative methodologies overlap in their constructs and approaches; therefore, the researcher must deeply analyze and selectively choose the best option for their specific research topic and questions.

The best methodology for answering the research questions in the proposed study is a case study. A case study is a research approach that generates an in-depth, multi-faceted understanding of the experience of a single person or group of people (Baxter & Jack, 2008; Green & Thorogood, 2018; Takahashi & Araujo, 2020; Yin, 2017). Case studies are used in many disciplines and frequently in the social sciences. The history of the case study traces back to the demand by social scientists in the late 1980s, asking the central question of how social scientists analyze information and produce results that contribute to knowledge (Takahashi & Araujo, 2020). Although there is some debate on what qualifies as a case study methodology, the shared premise and accepted standard among social scientists is the notion that case studies feature exploration and highlighting of a specific phenomenon, leading to a more profound understanding of such (Baxter & Jack, 2008; Green & Thorogood, 2018; Takahashi & Araujo, 2020; Yin, 2017).

Case studies exemplify the concept of understanding the unique values of qualitative and quantitative research methods. While generalizations are still important, there are various perspectives and depths to a phenomenon. There is ample literature supporting case study methodologies; however, Yin (2017) has established himself as a prominent scholar and supporter of qualitative case study design. Yin (2017) indicated that the case study method is its

own method and design and provided a guide for researchers based on a six-step plan for practical and technical considerations of qualitative case studies, including planning, designing, preparing, collecting data, analyzing data, and reporting. Further, he emphasized the role of validity and reliability (sometimes embedded under the realm of trustworthiness) in case studies. He strongly asserted that rigorous and methodologically sound case study practices are fully capable of producing high-quality research. The author also clarifies that such high-quality research is contingent upon the researcher's breadth of skills and expertise.

Exploratory Case Study

Researchers utilizing the case study methodology must carefully consider which case study best suits their research goals. A case study may be exploratory, descriptive, single or multiple, instrumental or collective, or explanatory (Takahashi & Araujo, 2020). The philosophy behind case study design relies on the relationship between the participant and the researcher and the subjective perspectives of each (Baxter & Jack, 2008; Green & Thorogood, 2018; Takahashi & Araujo, 2020). Following data collection, data analysis occurs by describing and analyzing the case via identifying themes and sub-themes (Baxter & Jack, 2008). Additionally, case study design relies heavily on the impossibility of manipulating participants' behavior (Baxter & Jack, 2008). Case studies can be labor intensive and generate diverse data; thus, others often criticize this type of methodology for its lack of generalizability. However, the overarching premise of a case study is its focus on providing rich descriptions and a deep understanding of a problem (Clark & Foster, 2017; Luciani et al., 2019; Maxfield & Babbie, 2018).

In this study, the researcher opted for an exploratory case study design and anticipated the presentation of a comprehensive understanding of the perceptions and education of law enforcement officers as such pertains to their cardiovascular health and behaviors. Notably, the

exploratory approach does not rely on any single set of outcomes (Baxter & Jack, 2008; Green & Thorogood). Instead, such a design captures participants' broad perspectives and situational experiences, leading to deeper awareness and knowledge about a particular phenomenon. Additionally, case study design often utilizes multiple data collection methods, including observation, interviews, focus groups, audio recording, and document review (Baxter & Jack, 2008; Green & Thorogood, 2018; Takahashi & Araujo, 2020).

Ethnographic Studies

Because of its similarity to case studies, the researcher in this study considered an ethnographic design. This approach focuses on individuals' perceptions and experiences within their culture-sharing group (Baxter & Jack, 2008; Clark & Foster, 2017; Takahashi & Araujo, 2020). Such an approach presents a broader picture of a culture where researchers describe and interpret shared patterns and behaviors of culture using an intrinsic or extrinsic lens within the culture via researcher observation of the group (Baxter & Jack, 2008; Clark & Foster, 2017; Takahashi & Araujo, 2020; Yin, 2017). Given the researcher's established position as a law enforcement practitioner with experience in the field, the researcher is already quite familiar with law enforcement culture. Therefore, conducting an ethnographic study in this situation may pose a severe risk of researcher bias, potentially compromising the integrity of the study and rendering its outcomes untrustworthy.

Phenomenological Studies

The researcher of this study also considered a phenomenological research design. More recently referred to as descriptive or interpretive phenomenology (Rodriguez & Smith, 2018), the phenomenological approach utilizes the exploration of individual experiences via understanding the essence of the experience (Creswell & Creswell, 2017; Rodriguez & Smith, 2018). A

phenomenological study tells the story of the lived experience through the lens of the person experiencing (or who has experienced) the phenomenon. In this study, the researcher had no prior awareness of which participants have lived experience of cardiovascular disease. Instead, the researcher sought a deeper understanding of law enforcement officers' perceptions of cardiovascular disease risk and behaviors associated with such risk, including the availability of and exposure to cardiovascular health education. Thus, the phenomenological approach does not apply to the goals of the study.

Participatory Action Research

If a researcher intends to formulate and invoke solutions to some phenomenon, they may opt for an action research design. This type of design, also referred to as participatory action research, involves participants in its fundamental analysis; in some instances, participants become co-researchers. The researcher and participant work together to plan, implement, and assess a program or action that contributes to a needed change (Dick, 2017). In these types of studies, data collection and analysis are integrated and iterative in that the participant and researcher communicate and collaborate (Dick, 2017; Mills & Birks, 2014). Although the phenomenon (elevated cardiovascular disease among law enforcement personnel) in the proposed study requires action, developing and implementing an adequate and effective solution requires obtaining preliminary information captured via a different approach. Thus, utilizing a case study design should contribute to the existing literature and produce new knowledge that leads to potential solutions.

Grounded Theory

Grounded theory is another methodology often utilized in qualitative research. In this type of design, the researcher carefully observes a social construct or phenomenon to construct a

new theory (Chamaz, 2017; Tie et al., 2019). The researcher collects and analyzes such data simultaneously, relying on one component informing the other. In grounded theory, the data collection process advances based on the development of concepts, categories, and themes (Charmaz, 2017), producing a cyclical and iterative approach to establishing an inductive theory (Tie et al., 2019). A grounded theory design would be applicable to the proposed study if the research questions centered specifically on identifying barriers to cardiovascular disease risk awareness and intervention among the law enforcement population. However, the goal of this study requires a broader inquiry captured through a different approach. Although identifying barriers to this phenomenon may be vastly productive in formulating a theory about cardiovascular disease awareness and intervention among law enforcement officers, this approach may not fully achieve the goals of understanding the perceptions and experiences of law enforcement officers about their cardiovascular health. Thus, the need for a deeper understanding of this complex issue called for an exploratory case study approach.

Research Questions

Research Question 1: How do law enforcement officers in the study perceive their risk of cardiovascular disease?

Research Question 2: How do law enforcement officers in the study mitigate their risk of cardiovascular disease?

Setting

The setting for the study was law enforcement agencies located in Ohio. Because Ohio is the geographical location where the researcher resides, it seems feasible and convenient to conduct the study in this setting. However, the researcher did not choose this site selection based on mere convenience. Rather, by limiting the setting to only law enforcement agencies in Ohio,

the study results may be generalizable to other Ohio agencies, which may influence future intervention to reduce cardiovascular disease risk among Ohio law enforcement officers. Additionally, the study setting was law enforcement agencies as these organizations employ the population affected by a high risk of cardiovascular disease. The researcher assigned the law enforcement agencies and individual participants pseudonyms not readily identifiable to anyone other than the researcher.

Participants

The study included a purposive sample of participants working full-time as law enforcement officers in law enforcement agencies in Ohio. Participation was voluntary. The researcher chose the population based on cardiovascular disease risk among law enforcement. Further, the study included law enforcement officers because of the lack of literature on their perceptions of their cardiovascular disease risk and the relationship between said perceptions and mitigation of such risk. Participants' inclusion criteria were active (employed full-time), certified law enforcement officers in Ohio. The researcher confirmed the status of participants by obtaining their signature on the consent form that included their acknowledgment that they met the requirements of the study. Although there were no personal identifiers listed in the study, the researcher included certain participants' demographics, such as age (Table 1), sex (Table 2), race (Table 3), and years of service (Table 4), for analytic purposes.

Table 1. Participant Age. n=11

21-30 years of age	27.5%
31-40 years of age	45%
41-50 years of age	27.5%

Table 2. Participant Sex. n=11

Male	73%
Female	27%

Table 3. Participant Race. n=11

White	100%
Black	0%
Hispanic	0%
Other	0%

Table 4. Participant Years of Service. n=11

<1 – 5 years	27.3%
6 – 10 years	45.4%
11 – 15 years	9.1%
16 – 20 years	0%
21 – 25 years	18.2%

Sampling

The researcher utilized convenience sampling due to the geographical location and access to participants via personal networking. The goal for this study was 10 to 15 participants or until the researcher reached data saturation. Although this sample size of participants is a small percent of all police officers in Ohio (approximately 27,000 [Ohio Collaborative Community-Police Advisory Board, 2021]), this number represents a reasonable goal for the study as qualitative research requires an in-depth examination of data (Baxter & Jack, 2008; Green & Thorogood, 2018; Takahashi & Araujo, 2020; Vasileiou et al., 2018; Yin, 2017).). Further, a smaller sample size is feasible because police officers are not always forthcoming in their participation in research studies. The units of analysis were individual, active (working full-time) police officers employed by law enforcement agencies in Ohio. The researcher anticipated approximately 10 to 15 participants in the study, representing less than 0.5 percent of all Ohio law enforcement officers (Ohio Collaborative Community-Police Advisory Board, 2021). The researcher conducted semi-structured interviews of participants by asking open-and closed-ended questions created by the researcher based on elements of the HBM theory and the literature

review. The researcher assigned participants pseudonyms not readily identifiable by anyone other than the researcher.

Participant Recruitment

The researcher emailed law enforcement agency leaders in Ohio, briefly explaining the study and requesting permission to utilize their membership lists to recruit participants (Appendix A). The researcher targeted law enforcement agencies within adjacent counties of their geographical location and aimed to recruit three to four participants per agency. The researcher also considered utilizing snowball sampling for additional recruitment. Snowball sampling is a non-probability method where participating research participants refer additional subjects for a study (Glesne, 2016). This study may have required snowball sampling for establishing alternate participants in the case of participant drop-out or until the researcher reached data saturation. Once selected, the researcher briefed participants via an introductory welcome email and informed them of an anticipated timeline and schedule. The researcher then coordinated times to meet with participants for the interviews. Study participants received notification reminders of the interview approximately one week before its scheduled date. Upon approval from the Institutional Review Board (IRB), the researcher met with participants for data collection.

Procedures

Institutional Review Board Approval

Social scientists must practice awareness of all the various dimensions of their study; however, conquering such a task alone may challenge researchers. Therefore, dependence and reliance on others are necessary to produce quality work. As noted by Glesne (2016) and Gunnison and Helfgott (2021), scientific research tragedies of the past led to the introduction of

Institutional Review Boards (IRBs) for colleges and universities accepting federal funding. The IRBs maintain a responsibility to review the studies involving human subjects before the commencement of the study. According to Glesne (2016), IRBs oversee studies to uphold ethical principles established by the Belmont Report and emphasized by other groups such as the American Sociological Association and the American Psychological Association. Although Gunnison and Helfgott (2021) note criticism of IRBs for their alleged primary responsibility of protecting institutions from lawsuits rather than maintaining ethical standards, the use of IRBs remains critical to researchers focused on eliminating the risk of harm to participants.

Consent for Participation

Before beginning the audio-recorded interview, the researcher asked the participant to sign and return a consent form (Appendix D) confirming their voluntary participation in the study and consent for the researcher to use the data collected. These practices thus eliminated any potential breach of the Health Insurance Portability and Accountability Act (HIPAA), which prevents the release of health-related information without the party's consent. The participant was aware of the researcher taking handwritten notes during the interview. The participant was aware that they could have ceased the interview at any time without an adverse reaction from the researcher.

Interview Planning and Participation

Following the study proposal defense, the researcher asked existing law enforcement experts, such as active or retired law enforcement command staff, to review and critique interview questions. The researcher also piloted the interview with the active or retired law enforcement command staff to ensure clarity and wording. Following IRB approval, the researcher actively recruited participants (Appendix B) and scheduled interviews. The researcher

then met with participants for the semi-structured interviews. The interviews started with fundamental questions about participant demographics, including verbal confirmation that they are a police officer working in Ohio, their age, race, sex, and years of service. The researcher established rapport by sharing some personal background and reasons for the study. The interview included questions pertaining to the five key elements of the HBM theory (perceived susceptibility and severity, perceived benefits and barriers to intervention, and cues to action) related to cardiovascular health and law enforcement work. Additionally, the researcher provided educational cardiovascular health information to participants in the form of a handout about the risk of cardiovascular disease for law enforcement, stress management options, and specific cardiovascular disease scanning methods participants can discuss with their medical providers (Appendix F).

Instrumentation and Operationalization of Constructs

The interviews consisted of closed- and open-ended questions that explored an understanding of cardiovascular disease among law enforcement, perceptions of susceptibility and severity to cardiovascular disease, health history, health behaviors, and perceptions of benefits and barriers of prevention. Additionally, the interview included questions about specialized cardiovascular testing and education, physician awareness of the participant's occupation, and personal understanding of physiological stress reactions. The researcher then compared the data from each of the constructs.

The researcher developed interview questions based on concepts derived from the HBM and the literature review. Interview questions consisted of closed- and open-ended questions about the subject; however, the interviews also included the introduction of follow-up or clarifying questions based on the participants' responses. Prior to commencing the study and

following IRB approval, the researcher asked law enforcement practitioners to review the interview questions. The researcher also piloted the interview with this small sample of participants outside of the study sample to ensure proper wording of the questions and clarity of the content.

The Role of the Researcher

The researcher in a qualitative study takes on multiple roles with several responsibilities. One such function is as an investigator seeking information about a particular subject. For this study, the researcher identified a significant problem (high rates of cardiovascular health problems among law enforcement officers) and gaps in the literature on a lack of information about the awareness of such issues), and designed the proposed study based on the need for more information about this phenomenon. Furthermore, the researcher in this study also served as a human instrument responsible for collecting and correctly reporting information. Importantly, the qualitative researcher must carefully distance themselves from participants without becoming disengaged with them. Given that the researcher in this study was familiar with law enforcement culture and practices, the researcher maintained an open mind about the research and exercised caution by eliminating bias or assumptions. By carefully generating relevant interview questions and guiding the interview with the prompting of participants, the researcher immersed themselves in the data while remaining fair and impartial. Lastly, and perhaps most importantly, the role of the researcher was to maintain the integrity of the study from beginning to end.

Data Collection and Interpretation

Interviews

Interviewing participants is a frequent way researchers acquire social science data (Maxfield & Babbie, 2018). An essential element of obtaining qualitative data centers around

deliberately working toward identifying the most critical elements of information (Linneberg & Korsgaard, 2019). This researcher identified a qualitative case study concept for this research that focuses on idiographic interviews of participants. By utilizing peer-reviewed journals and scholarly articles, the researcher formulated interview questions that captured crucial components of the content of the study. Therefore, the interview questions comprised an understanding of cardiovascular disease, subjective risk perceptions, and mitigation of cardiovascular disease. Additionally, the researcher made practical and theoretical considerations for data collection.

Rojek et al. (2019) highlighted the challenges and benefits of positive researcher-practitioner relationships; furthermore, Lumsden (2017) pointed out that there may be potential resistance to participation in academic research between law enforcement officers and scholars. However, Glesne (2016) noted that researchers must understand the need for sensitivity when conducting studies. Because the subject of cardiovascular disease-related issues is of great importance to this researcher, there is an understanding of the significance of establishing and maintaining its integrity. The results of this study will potentially contribute to improvements for law enforcement officers and their families.

The recent public health pandemic (COVID-19), along with an increase in video communications over the last few years, may have created challenges to interviewing in person (Gray et al., 2020); however, the benefits of an in-person interview assist the researcher and participant in establishing and building rapport, developing mutual relationships, and producing reliable data. The researcher considered the use of virtual interviews if requested by participants for safety reasons. Interviews in the proposed study faced some risk of a lack of participant buy-in and hesitation. For example, because of the invincibility culture within law enforcement noted

by White et al. (2016), research participants may resist participation in a study if they feel as if they are being examined, scrutinized, or vulnerable. Therefore, it is imperative to set the dialogue early on, as Glesne (2016) and O'Leary (2005) noted in their suggestions for researcher reliance on building rapport and establishing trust.

Glesne (2016) also noted that individual interviews allow researchers to immerse themselves in a culture, group of people, or population. Because the researcher is already quite familiar with law enforcement culture, they must form and ask interview questions with sensitivity to the subject. Further, the researcher must exercise caution and restraint in leading the participant. Thus, the researcher maintained a course of focus on the interview questions. Field research such as this leads to the emergence of themes and patterns helpful for identifying and solving problems. Therefore, this researcher conducted individual, in-depth, semi-structured interviews with a purposive, convenience sample of 11 Ohio law enforcement officers with varied demographic backgrounds. Via face-to-face, one-on-one interviews with law enforcement officers, the study captured different variables measuring several factors, including law enforcement officers' understanding of cardiovascular disease, their perceptions of susceptibility and severity of cardiovascular disease, their perceptions of benefits and barriers of mitigation, their reported health behaviors, and their exposure to cardiovascular health education. The researcher collected and analyzed the data and compared officers' perceptions of their cardiovascular disease risk with their reported health behaviors and their exposure to cardiovascular health education.

The interview questions included content applicable to officer perceptions of risk (susceptibility and severity of cardiovascular disease), health history, reported health behaviors they use to mitigate such risk (barriers and benefits of mitigation), and what personal information

they share with others. Additionally, the interview included questions about external influences impacting officer perceptions and actions. The study excluded one element of the health behavior model; the *self-efficacy* component was excluded due to the belief that law enforcement officers have the cognitive ability to make personal decisions for themselves and take action when necessary.

Interview Questions

1. Will you tell me a little bit about your yourself, such as your background, years of service, hobbies, and family?
2. As mentioned, the focus of this study is law enforcement cardiovascular health. How would you rank your heart disease/attack risk: no risk, low-risk, medium-risk, or high-risk, and why?
3. Have you had a heart attack or stroke in the past?
4. How would/did you having a serious health condition such as a non-fatal heart attack or stroke change your life?
5. If you died from a heart attack today, how do you think this would affect others?
6. There is suggestive evidence that law enforcement officers experience greater rates of heart issues and have lower life expectancy compared to the general population. Why do you think this is?
7. I am sure you are familiar with the occupational stressors of your work; how do you think stress levels compare between the general population and most law enforcement officers, and why?
8. Where would you rank your overall level of stress on a scale of none, low, medium, and high, and why?

9. Compared to other law enforcement officers that you know, how would you rank your stress level on a scale of lower, similar, or greater?
10. The body responds to stress in different ways, and sometimes involuntary, physiological reactions occur. Do you feel that you can control these types of reactions?
11. Given what we know about the stress of law enforcement, there has been an increase in focus on stress management training such as resiliency, mindfulness, etc. What kinds of things do you do to manage your stress?
12. Can you describe how other people show their concern for you if they think you are overly stressed?
13. Who do you confide in within and outside of work?
14. What can you tell me about your eating habits, and what factors influence your choices?
15. What can you tell me about your sleep habits, and what factors influence your choices?
16. What can you tell me about your exercise habits, and what factors influence your choices?
17. How often do you take additional time off (such as comp time or vacation)?
18. Who do you spend most of your time with when you are not at work?
19. When you are off-duty, do you still feel as if you are on-duty or find yourself thinking about work?
20. Shifting gears a bit, how often do you get traditional health screenings such as blood pressure, cholesterol, etc.?
21. Does your primary healthcare provider know your occupation; if so, does this ever factor into decisions about your healthcare?
22. Have you ever participated in any programs or training focused on heart health?

23. Are you familiar with any specialized cardiovascular disease screenings?
24. Under what circumstances would you consider getting a specialized cardiovascular disease screening?
25. Do you have any spiritual influences that impact the way you manage the demands of law enforcement?

Question one is an orienting question designed to establish a comfortable and straightforward dialog between the participants. The first question invited the participant to share personal background about their career choice and motivational factors that may potentially impact their health behaviors. Question one is also a knowledge question; it is neither private nor invasive. For example, most law enforcement officer uniforms contain insignia (for example, metal stars) indicating the officer's years of service. This question is relatively non-threatening and served as a strategy for building rapport between the researcher and the participant. Roberts (2020) noted that orienting questions put the researcher and participant at ease with each other and establish a basis for the rest of the interview. At the beginning point of the interview, the researcher introduces the subject of the discussion and sets expectations for the interview (Roberts, 2020).

Questions two through five are the main questions that closely align with the research questions. Roberts (2020) noted that the main questions serve as an introduction to the focus of the study and ask the researcher to tell their experiences from their point of view. The six principles of the HBM theory (Rosenstock, 1966; Rosenstock, 1974) used for predicting whether people will engage in the prevention and mitigation of health concerns include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Therefore, the interview questions must encapsulate these elements. Additionally, as

Conner and Norman (2017) noted, it is equally essential that interview questions also include opportunities for identifying the demographic, social, and emotional variables that may serve as modifiers to individual perceptions and mitigation of cardiovascular disease health risks.

Question two addressed the participant's perceptions of their susceptibility to cardiovascular disease. Question three includes information about personal health history, which was designed to provide insight into their risk perceptions of susceptibility and uncovered cues for reported health behaviors. Questions four and five addressed their perceived severity of such risk. As indicated by the HBM theory (Rosenstock, 1966/1974), a combination of one's perceptions of susceptibility and severity, coupled with cues to action, influences their health behaviors. Therefore, it was important to ask questions about the participant's risk perceptions and compare the responses with other information provided.

The current literature on cardiovascular health risks for law enforcement officers suggests a correlation between such problems with biological, psychological, and physiological stress responses. The research indicates reactions to occupational stressors include depression, anxiety, post-traumatic stress disorder (PTSD), and suicide (Courts & Mosniak, 2015; Maran et al., 2018; Thoen et al., 2020; Violanti et al., 2017), as well as physiological responses to stress such as sudden cardiac death, metabolic syndrome (Met Syn), and other body system dysfunctions. Question six is a probing question that served as an introductory question for identifying perceptions regarding the possible correlation between cardiovascular problems and law enforcement officers. This question probed into cardiovascular disease risk from a general, rather than individual, perspective in an unthreatening manner, which allowed the participant to think critically about the matter without disclosing any personal factors.

Questions seven through nine are probing questions intended to hone on the participants' intrinsic stressors and their responses to such. Question seven is a segue question that asked the participant for input from a general versus individual perspective, which is non-threatening and allows the participant to reflect on the matter from a generalized standpoint before responding to more personal questions. Questions eight and nine are comparative questions that directly addressed participants' reported stress factors compared to non-participants' stress factors. These questions opened up the opportunity for an in-depth discussion about factors specifically related to the stress of law enforcement work. They also served as precursory questions to question ten, which explicitly addressed participant perceptions of psychological and physiological stress responses and their reactions to such.

These probing questions provided a gauge for analysis of how participants viewed their stress factors relative to others. Studies by Grego et al. (2018), Shiozaki et al. (2017), and Thayyil et al. (2018) indicate that police perception of stressors does not always align with their clinical risk factors. Further, the Grego et al. (2018) study demonstrated that officers perceived fewer stressors and greater perceptions of well-being than non-law enforcement officers. Therefore, these questions provided the opportunity to discover and understand risk perceptions compared to the general population.

Question ten also introduced an opportunity for understanding perceptions of involuntary, physiological stress responses. Violanti et al. (2017) noted that certain stressors invoke involuntary, physiological reactions uncontrollable to the human body. Such physiological responses to stress include an increased risk of sudden cardiac death, metabolic syndrome (Met Syn), and other body system dysfunctions. Therefore, the probing questions about participants' knowledge and experience with physiological stress reactions were designed to provide a more

profound understanding of their perceptions of stressors and their ability to control such responses.

The literature indicates a connection between increases in stress management practices and the effectiveness of such programs within law enforcement. Question 11 is a probing question that focuses solely on stress management techniques. Ramey et al. (2017) noted that police academy cadets trained on triggers and physiology of stress and how modifying involuntary reactions to such stress demonstrated increased resiliency coherence for participants in the study. Therefore, responses to this question provided insight into how a specific intervention may impact cardiovascular health. There is also growing evidence supporting the introduction of programs such as resiliency and mindfulness within law enforcement, as evidenced by the work of many scholars (Christopher et al., 2020; Domes et al., 2019; Lees et al., 2019). Research by Taylor et al. (2021) and Williams and Ramsey (2017) focuses on stress management intervention via the concept of wellness initiatives. Such programs focus not only on physical wellness, such as cardiovascular health, but also on stress management interventions for anxiety, PTSD, and burnout among law enforcement officers.

Question 12 is a segue to question 13, which is a probing question designed to delve into the topic of social support. Violanti et al. (2016) noted that a lack of social support for law enforcement officers is directly related to increased health problems, including cardiovascular disease. Therefore, interview questions regarding social support may uncover how such support impacts participants' health behaviors. Further, questions about social support may provide insight into how outsiders (such as family members and non-law enforcement peers) view participants' stress responses. The researcher conducted a comparative analysis of responses to

perceptions of stress in questions eight and nine with answers about their stress management in question eleven.

Given the associations between positive social support and stress management for law enforcement (Galbraith et al., 2020; Dollard et al., 2019), question twelve naturally follows participant-specific questions pertaining to their stress responses. As Roberts (2020) indicated, follow-up questions evolve from excellent listening on the researcher's part. Questions 12 and 13 are follow-up questions reflective of social support. Although these questions focus on stress mitigation and potential coping techniques rather than actual stress levels, the researcher will exercise flexibility and active listening skills in preparation for asking additional follow-up questions.

Questions 14 through 16 are probing questions addressed lifestyle factors related to cardiovascular health risks. Several researchers (Drogos et al., 2019; Kuehl et al., 2016; Verani et al., 2021; Wood et al., 2017; Wunsch et al., 2019) studied the effects of physical activity and adequate nutrition on general health and well-being. Research by Mücke et al. (2018) identified physical activity associated with reduced subclinical markers for CVD in several studies. Because law enforcement officers may face greater challenges in achieving optimal exercise and nutrition due to the odd and inconsistent eating and sleeping habits associated with their occupational job demands, interview questions should ask about these lifestyle factors. Further, data from Schilling et al. (2019) indicated that high cardiorespiratory fitness is associated with lower CVD risk factors which mediated the effects of occupational stressors and job demands. Therefore, these interview questions should capture elements of lifestyle influences and behaviors of this group of law enforcement officers.

Questions 17 through 19 are probing questions pertaining to job demands and burnout within law enforcement. These questions also explored the personalities of law enforcement officers that may correlate or conflict with the existing police culture. A study by Santa Maria et al. (2018) revealed that job demands and burnout played a significant role in law enforcement officers' physical and psychological health. They also noted the positive relationship between burnout and predictions of anxiety and depression. Another critical aspect of law enforcement work is the relationship between symptoms of burnout and interpersonal relationships. These variables may present potential cyclical impacts on the other (Clifton et al., 2018). Thus, interview questions focusing on these elements were designed to reveal information about the role of job demands and burnout and the effects of such on participants and their families.

Similarly, the subject of question 18 naturally followed the previous questions but recaptured the social support element discussed above. This re-cap question pertains explicitly to social support structures in place for the participant. The researcher analyzed responses to this question against responses to the other questions related to social support. Question 19 also touched upon the concept of current police culture. Many law enforcement officers experience the inability to step away from their work when off duty. Due to the traditional hypervigilant and invincible culture of policing (Bullock & Garland, 2017), participants may experience relationship problems (Clifton et al., 2018). Thus, the interview questions regarding checking out of their law enforcement role were designed to provide insight into participants' perceptions of job demands and cultural expectations.

Given the ample literature on the high risk of cardiovascular disease among the law enforcement population, the interview should include questions specific to various elements of cardiovascular disease. Thus, questions 20 through 24 were the main questions targeted at

cardiovascular health awareness and screening. These questions specifically addressed the issue of exposure to education surrounding such and communication between the participant and their health care team. Question 20 touched on mitigation via general health screenings (which typically capture symptoms of metabolic syndrome). In contrast, questions 22 through 23 focused more specifically on the knowledge and awareness of available cardiovascular screening noted by Sheinberg (2020).

Question 21 captured information about the depth of communication between participants and their healthcare providers, which was implemented to provide insight into cardiovascular risk education and awareness. Question 23 related directly to an intervention specifically aimed at cardiovascular health education from multiple perspectives. MacMillan et al. (2017) and Sisti et al. (2018) studied the effects of diet and exercise lifestyle interventions on the cardiovascular health of high-risk groups and found positive impacts of such educational programs. Question 24 probed into specific behaviors related to specialized cardiovascular screening and revealed information about participants' cues to action. Question 25 addressed specific faith-based influences on participants' methods of mitigation of occupational demands of law enforcement work.

Observations

The study consisted of scheduled observations of participants occurring concurrently with the interviews. The researcher acted as an active participant in the interview process, directing the interview flow with a set of established questions used as a guide for the interview. Whereas the researcher depended primarily on verbal data collected via the interview process, observing facial expressions, tone of voice, and emotional responses were also important. The researcher noted and recorded these elements throughout the interviews. Importantly, the researcher

expressed sensitivity to particular body language that indicated the participant was uncomfortable. Thus, the researcher refrained from pressing the participant or causing emotional distress.

Field Notes

The researcher took handwritten notes and recorded verbal and non-verbal responses, notations for follow-up questions, and other information pertinent to the research throughout the interview process. As the interview was taking place, the researcher recorded participant responses. The researcher used abbreviations and symbols to represent some aspects of the participant's responses. The interview also included follow-up questions to the responses; for example, if an answer required further probing or detail, the researcher paraphrased or clarified the question. Following the interviews, the researcher uploaded the handwritten field notes into MAXQDA (a qualitative data analysis software) for coding. The researcher ensured that field notes written about certain questions accurately represented the correct time of questions asked in the audio-recorded interview, fully capturing all of the responses.

Data Analysis

Following data collection, the researcher organized the data and uploaded the interviews and field notes to MAXQDA software for analysis. The researcher transcribed participants' responses to the interviews using MAXQDA and Microsoft Office. The researcher analyzed data using MAXQDA and Microsoft Office. The researcher analyzed the data by individual and combined variables. The researcher created tables to demonstrate the potential relationships between the identified variables. The research questions are 1) How do law enforcement officers perceive their cardiovascular disease risk? 2) How do law enforcement officers mitigate their cardiovascular disease risk? The researcher examined how law enforcement officers in Ohio

perceive and mitigate their risk of cardiovascular disease. The researcher also looked for themes, patterns, and relationships between participants' perceptions of cardiovascular disease risk and their reported health behaviors. Additionally, utilizing data based on the HBM theory (Rosenstock, 1966/1974), the researcher explored officers' reported cues to action.

Coding Data

Utilizing MAXQDA, the researcher applied qualitative data coding to organize and analyze participant responses. Although data coding is not without some inherent risks (Linneberg et al., 2019), its use in social sciences remains prominent. According to Glesne (2016), the data codes evolve into part of the research, working towards identifying and exploring patterns specific to the research subject and emphasizing the true essence and meaning behind collected data. Furthermore, although time-consuming and demanding, data coding becomes an imperative part of the qualitative research process. Qualitative data coding includes gaining information based on observations of individuals or groups of people, surveying participants, or conducting interviews. The researcher also coded data based on existing literature and organized information obtained throughout the research process (Linneberg et al., 2019).

Within a short time after each interview, the researcher coded the data to eliminate the risk of misunderstanding or forgetting key pieces of information. The data codes included participant-ranked low-, medium-, and high-risk perceptions of susceptibility to cardiovascular disease or death and perceptions of the severity of cardiovascular disease or death; identified barriers and benefits of cardiovascular disease intervention; methods of mitigation; cues to action. Glesne (2016) noted that data codes evolve into part of the research, working towards identifying and exploring patterns specific to the research subject. Coding data allows the researcher to maintain control of the study, refrain from becoming too overwhelmed with the

data, and gain deep insight into their study topic. Linneberg et al. (2019) stressed that data coding provides opportunities for the researcher development of a comprehensive understanding of their data.

Importantly, scholars noted that researchers must exercise caution by managing potential issues of transparency and validity (Linneberg et al., 2019). Therefore, this researcher included all provided information, regardless of its relevance to the topic, and exercised awareness about the possibility of the emergence of other themes or patterns as the study progressed. Because it is unlikely that no two researchers will code precisely the same way and the data coding is subjective due to the inherent nature of qualitative work (Linneberg et al., 2019), the study faced some risk of researcher bias which posed minimal threats to its validity.

Trustworthiness

The quality of any research study solely depends on principles of integrity captured via the umbrella of trustworthiness in qualitative research (Luciani et al., 2019; Maxfield & Babbie, 2018). Cypress (2017) defines trustworthiness as a combination of factors, including quality, authenticity, and truthfulness of research findings, emphasizing the degree of trust and confidence established by the researcher that supports the work. The qualitative researcher must practice such principles at all times, maintaining a committed focus on ensuring elements of trustworthiness—credibility, dependability and confirmability, and transferability. These terms are synonymous with validity, reliability, and generalizability in quantitative research. However, despite continuous debate and critique of quality in qualitative research, scholars understand the basic concepts of these factors that parallel those originating from quantitative practices (Cypress, 2017; Earnest, 2020; Korstjens & Moser, 2017).

Regardless of the continuous debate, many scholars agree the principles of each variable are the same: to ensure trustworthiness (Luciani et al., 2019). The researcher must ensure trustworthiness by enhancing each element and minimizing potential threats. As with any scientific research, this qualitative study faced minimal threats to its credibility, dependability, confirmability, and transferability. However, the researcher made all reasonable efforts to reduce such limitations by opting for strategies designed to enhance elements of trustworthiness. There is an established element of trust on the part of the researcher, given their background and credible reputation in the criminal justice field.

In their research on qualitative studies, Creswell & Creswell (2017) highlighted key strategies for improving rigor and recommended that researchers choose at least two. As tools for ensuring credibility, dependability, confirmability, and transferability, the researcher will include prolonged engagement, thick descriptions, an audit trail, and triangulation. Additionally, the researcher included some direct quotes from participants throughout the results and recommendations sections of the study. Notably, the researcher's high level of personal integrity, which underscores the necessity of maintaining a commitment to enhancing trustworthiness in any research study, served as the foundation of the proposed study.

Credibility

Credibility is the term used by social scientists in qualitative research that ensures that a study's findings accurately and concisely align with a captured truth (Earnest, 2020; O'Leary, 2005). Whereas the term is called validity in quantitative studies, the concept of credibility essentially depends on the quality and richness of the information gathered by the researcher and how well the researcher analyzes that information (Creswell & Creswell, 2017; Cypress, 2017; Earnest, 2017). An essential component of credibility involves understanding that qualitative

research findings are innately subjective; thus, the research and outcomes are flexible and broad (Korstjens & Moser, 2017). Further, the nature of qualitative work demands transparency and an accurate account of the truth on the researcher's part. Therefore, when viewed in such a case- or study-specific way, the findings must represent an actual reality, maintaining some acceptable level of consistency along the way.

A researcher tasked with ensuring the credibility element of trustworthiness in any research study must demonstrate two primary goals: first, they must establish themselves as credible, and second, they must adopt strategies that enhance honesty via transparency and clarity. Via the examination of police officers' self-reported perceptions and actions, this study faced threats to credibility due to participants' potential recall and inaccurate reporting bias. Threats to credibility also existed because variables unknown to the participant may subconsciously influence health behaviors. Lastly, the study also faced threats to credibility due to the inherently subjective nature of qualitative work. Despite these challenges, the researcher in this study has an established credible reputation due to their experience in criminal justice and high moral standards. Thus, the researcher was committed to enhancing all elements of trustworthiness by establishing and upholding personal and academic integrity.

Dependability and Confirmability

Aspects of dependability and confirmability in qualitative research parallel the terms reliability and objectivity, respectively, in traditional positivistic quantitative research (Maxfield & Babbie, 2018). These measures involve consistency and the stability of findings over time which, in qualitative research, involve rich detail and descriptions of the components of the study (Korstjens & Moser, 2017). Studies must be consistent in these measures to the extent that the study provides the same result each time. A dependable study exemplifies academic integrity

(O'Leary, 2005). Dependability includes an accurate and precise account of findings, interpretations, and recommendations supported by the data (Earnest, 2020; Korstjens & Moser, 2017). Therefore, the qualitative researcher must acknowledge inherent subjective bias in their work and take steps toward minimizing such. Establishing dependability is essential because it demonstrates the researcher's separation between reflexivity and prejudice. Instead, the analysis and interpretations of the findings are grounded in the data. Such findings are then much more reliable because the study results will be the same over time and conditions. The researcher in this study acknowledges and understands the critical need for reflexivity.

Similarly, confirmability mirrors the concept of consistency in its reliance on the issue of subjectivity in research. Confirmability includes the potential for congruence between different researchers regarding the accuracy and meaning of the data (Earnest, 2020; Korstjens & Moser, 2017). Confirmability regards establishing neutrality based not on researcher preferences or perceptions but the processes of data analysis and interpretation (Korstjens & Moser, 2017). Essentially, confirmability ensures that the research findings are legitimate, not simply figments of the researcher's imagination. Confirmability is important because it establishes an unclouded standard for interpretation and holds researchers accountable.

Because of the researcher's background and understanding of law enforcement culture and practices, there was a potential for researcher bias and challenges to dependability and credibility. However, the researcher agreed to practice critical self-reflection of such biases to not interfere with any aspect of the study. Further, a researcher bound by values of integrity should not be intimidated by the demand for confirmability. Instead, they should openly welcome it as it provides additional support for the findings.

Transferability

The concept of transferability pertains to the degree to which the results of a qualitative research study could transfer to other groups or settings (Earnest, 2020; Korstjens & Moser, 2017; Takahashi & Araujo, 2020). Transferability in qualitative research parallels the concept of generalizability in quantitative analysis. However, capturing transferability in a qualitative case study can be challenging because the intention of such studies is not to make broad generalizations (Takahashi & Araujo, 2020). Regardless of its challenges, transferability is important because, if captured accurately, findings from the study may have a significant impact on future research, specific populations, and public policy. Therefore, the qualitative researcher is responsible for enhancing the element of transferability by providing sufficient descriptions of context and data concerning the phenomenon.

Strategies for Enhancing Trustworthiness

Prolonged Engagement

One method for strengthening credibility is via the use of prolonged engagement. This type of method concerns the amount of time a researcher spends with participants. Rather than a brief, rigid interview comprised of closed-ended questions and little dialogue, prolonged engagement relies on a lasting presence during interviews ensuring researchers spend sufficient time with participants (Creswell, 2017; Korstjens & Moser, 2017). The determination of sufficiency is somewhat subjective; however, ample time in a qualitative interview consists of spending the requisite amount of time with participants to develop rapport and establish a comfortable level of trust and confidence between the researcher and the participant.

Just as important as the quantity of time spent with the participant is the ability of the researcher to bracket the information received. Bracketing involves researcher reflexivity.

Reflexivity is the practice of critical self-reflection about their position as the researcher, including their own bias, preferences, and preconceptions, as well as the relationship to the participant and the effects of that relationship on the study (Earnest, 2017). Spending a certain period engaged with participants assists the researcher in identifying and bracketing information, thus reducing researcher bias. Also, prolonged engagement allows the researcher more profound development and understanding of the intricate details of the phenomenon.

In this study, the researcher utilized prolonged engagement via participant interviews. The researcher anticipated that each interview would take approximately thirty minutes; however, the researcher also understood that the time with participants might require less or more time, depending on the circumstances. Each interview began with building rapport comprised of an informal discussion between the researcher and participant about backgrounds, work experiences, and reasons for the study. After moving on to the semi-structured, open-ended interview questions, the researcher asked clarifying and follow-up questions that prolonged the interview and thus prolonged the engagement of participants. The researcher also asked participants specific questions regarding their perceptions and behaviors pertaining to their cardiovascular risk and health. The researcher encouraged participants to support their responses with examples. The open and continuous communication between the researcher and participant created a relaxed environment where all parties felt comfortable and confident sharing information.

Thick Description

With prolonged engagement comes the opportunity for a thick description of the entire research setting. The thick description refers to the researcher providing a detailed, rich account of the experience and processes observed during data collection (Earnest, 2017; Korstjens &

Moser, 2017). This method relies heavily on the writing and rewriting skills of the researcher, who must provide a detailed presentation of the situation without too much or too little emotional reactivity on the reader's part (Earnest, 2017; Creswell & Creswell, 2017). A thick description augments the trustworthiness components of the proposed study. It enhances credibility by providing a breadth of knowledge supportive of the truth and interpretation surrounding the phenomenon. It also strengthens the dependability of the research by presenting a clear and concise representation of participants' accounts of the phenomenon, which later research may utilize in comparing and assessing for stability over time and conditions.

Furthermore, the thick description component presents the opportunity for transferability. The breadth of information captured from such deep descriptions in the law enforcement group may be applicable in other situations, perhaps among different first responder settings or groups. In this study, the researcher documented and accurately and concisely described the researcher's perceptions and reported behaviors. The demand for such thick descriptions aligns with research by Korstjens and Moser (2017) that highlighted the importance of the researcher reporting in-depth information and its context so that the participant experiences and behaviors reported by participants have meaning for someone outside of the study.

Audit Trail

The audit trail establishes dependability and confirmability in a study (Earnest, 2017; Korstjens & Moser, 2017). This strategy for enhancing trustworthiness includes a systematic and detailed record of the decisions concerning the study from its beginning to end (Korstjens & Moser, 2017). This record allows a neutral party or inquiry auditor to reach certain conclusions. An audit trail may include documents such as field notes regarding observation and interviews, documentation of the researcher's reasoning for decision-making, analysis of the data revealing

any themes or patterns confirming or suggesting a theoretical stance, and descriptive notes regarding the researcher's acknowledgment and awareness of reflexive responses (Earnest, 2020).

A primary goal of the audit trail includes an allowance for complete transparency, which enhances the trustworthiness components of dependability and confirmability. Thus, in this study, the researcher provided a detailed account of the research setting, participant recruitment, inclusion and exclusion criteria, sample size, participant demographics, interview questions and procedures, as well as additions or modifications to the interview questions resulting from the iterative approach inherent within qualitative research, and the detailed account and context of the collected data. By providing such rich information and researcher transparency, the researcher produced a complete audit trail.

Triangulation

Another approach toward enhancing credibility, dependability, and transferability within a qualitative study includes triangulation. The researcher utilized data triangulation, method triangulation, and theory triangulation approaches for this study. First, the researcher applied data triangulation via data collection from participants at more than one location and more than one level within the law enforcement organization. To capture data on various perspectives and experiences, the researcher interviewed participants at different agencies in Ohio. Additionally, this study included interviews with participants at different levels within the agency. For example, one participant was a road patrol officer, whereas another was a mid-level manager, such as a sergeant or lieutenant. With these standards in place, the researcher captured data from participants at different agencies and positions from the chain of command.

The researcher also applied method triangulation by gathering data from structured, open-ended research questions, observations, and field notes. Because the interviews included such different methods of data collection that furthered the understanding of the collected information, the researcher's analysis introduced a deeper and holistic understanding of the phenomenon. Additionally, the researcher utilized theory triangulation. This method includes using a specific theory or lens as a framework for data analysis and interpretation that assisted the researcher in supporting or refuting the hypothesis. This study had a theoretical foundation based on Rosenstock's (1966/1974) HBM theory which asserts that one's perceptions of susceptibility and severity of a health problem, coupled with intervention options and availability, as well as cues to action and self-efficacy, impact their health behaviors. The researcher derived the interview questions in the proposed study from elements of the HBM theory.

The researcher also collected and analyzed data from the lens of traditional police culture, suggesting a level of invincibility and bravado that may impact the perceptions and health behaviors of the phenomenon. Utilizing elements of the HBM theory and viewing through the lens of police culture assists the researcher in ruling out other correlational factors and prevents premature conceptualizations, which is parallel to searching for alternative explanations specific to the phenomenon (Earnest, 2017). Although this qualitative study comprises a case study method rather than a grounded theory approach, the researcher understood that the study's outcome included the possibility of a theory emerging from the data that could contribute to existing literature or induce future research.

Ethical Considerations

Ethical challenges abound in a fallen, broken world inhabited by fallible human beings. Horrific historical events often influence new policies and ethical procedures in many fields. Past

tragedies influenced current best practices for medical and social scientists. In the Tuskegee incidents, medical researchers took advantage of and harmed participants when they intentionally withheld syphilis treatment to study the long-term effects of the disease, causing significant harm to research participants with little regard for their physical, psychological, or emotional health (Glesne, 2016). Additionally, Haslam (2019) noted that the Stanford prison experiment in 1971 demonstrated the unethical treatment of participants by researchers attempting to understand the social and psychological effects of incarceration on prisoners and authorities. Such events led to the call for The Belmont Report.

The Belmont Report

The Belmont Report includes three ethical principles dictating scientific research: respect, beneficence, and justice. Respect for subjects demands that research participation occurs through voluntary and informed consent. Yanow and Schwartz-Shea (2018) emphasized that social science research must be free from deception and covertness. As noted by Anderson and Ichiho (2017), there are grey areas to research. The second principle established by the Belmont Report is beneficence; aligning with the said principle is the researcher's obligation, similar to the Hippocratic oath, to first and foremost cause no harm. Expanding upon this demand is an obligation to maximize benefits while minimizing harm. On some level, every social science study has the potential for damage. As human subjects are emotional beings, a researcher simply cannot predict potential harm to the participant from exposure to the study. However, as noted by O'Leary (2005), researchers must exercise caution and utilize best research practices, especially when examining emotionally sensitive topics. The third principle regards justice because there should be no discrimination by researchers when selecting participants. Taking advantage of weak or vulnerable populations is vehemently prohibited.

There are no ethical barriers to disclose to the Institutional Review Board (IRB). Although the participants discussed their health information with the researcher, the researcher did not disclose specific names or personal identifiers of the individuals. Also, because the researcher is a law enforcement officer in Ohio, the study excluded participants from her workplace agency. Additionally, because the researcher shared research and interview questions with her husband, a law enforcement officer in Ohio if he received an invitation to participate in the study, he declined such. Furthermore, due to the close-knit law enforcement community, the researcher excluded anyone personally known to her from the study. Excluding such participants eliminated the study's only known potential conflict of interest.

There was minimal risk of harm to participants in the study. Answering the interview questions may have invoked a minimal risk of emotional or psychological injury based on the sensitivity of the questions; however, the risk is comparable to the individual having a conversation with any other person. Furthermore, to protect participant anonymity and confidentiality, the researcher used pseudonyms and initials in place of identifying information. All collected data and recordings will be stored on a password-protected external drive and stored in a safe for the requisite period 3-year period. This storage solution eliminates any potential data loss or IRB concerns. The only potential breach of privacy will be if the data is lost or stolen, and even in this case, there will be no risk to participants. After three years, the researcher will destroy the information on their personal computer and any software programs. There are no other conflicts of interest to report.

Summary

This study was a qualitative examination and analysis of data from a sample of police officers in Ohio law enforcement agencies on their perceptions and mitigation of cardiovascular

disease. Applying the principles of the HBM theory (Rosenstock 1966/1974), the researcher investigated and analyzed officers' perceptions of susceptibility and severity of cardiovascular problems and their perceptions about the benefits and barriers to mitigation of such. The study also included examining and analyzing the relationship between said factors and cardiovascular health education.

Given the available literature on the associations between law enforcement work and cardiovascular disease-related death and illness of police officers, the study should contribute to understanding the relationship between these variables. Further, the study results revealed data for subsequent exploring of the causation of cardiovascular disease and death of law enforcement officers. Via deep exploration through qualitative interviewing, the study revealed themes and patterns that help criminal justice practitioners and scholars better understand how officers perceive their risks and the methods taken to mitigate such risks. The study may subsequently influence practices and improvements within the field. The examination and thematic analysis of the subject variables may not only contribute to greater law enforcement health awareness, but action taken as a result may reduce the cardiovascular related-illness and death rate among law enforcement.

CHAPTER FOUR: FINDINGS

Overview

To uncover and understand the unique variables contributing to law enforcement officers' perceptions of cardiovascular disease risk and their methods of mitigating such risks, the researcher conducted a qualitative case study that dove deeply into the complex issues surrounding the phenomenon of cardiovascular disease prevalence among the law enforcement population. This chapter includes detailed information on participants and data on their reported perceptions and mitigation of cardiovascular disease, as well as their perceptions of stress and management of such. To protect the confidentiality of participants, the researcher identifies each only by their assigned pseudonym and introduces them in alphabetical order. This chapter also presents the results of such data and an analysis that revealed the emerging themes and patterns. This qualitative case study aimed to explore law enforcement perceptions of cardiovascular disease risk and their health behaviors mitigating such risks and answer the research questions: 1) How do law enforcement officers perceive their cardiovascular disease risk? 2) How do law enforcement officers mitigate their cardiovascular disease risk?

Participants

Avery

Avery is a female law enforcement officer with seven years of service. She works at a rural county agency located near Columbus, Ohio. She was interested in other law enforcement careers before settling into her current role. Avery assists on the family farm and enjoys being outdoors. She is not married and has no children. She has a very close friend she relies on for social support—they talk frequently and spend a lot of time together. Avery has a cheerful demeanor and expresses an “it could always be worse” philosophy for handling the stress of life

and law enforcement. She enjoys her job but knows how to separate herself from it and focus on the things that make her happy, like spending time with her friends and family.

Beau

Beau is a male law enforcement officer in a municipal agency in a rural area near Columbus, Ohio. He has just under three years of service in law enforcement. Beau demonstrated a positive and respectful demeanor throughout the interview. Beau shared that immediately after high school, he went to college and switched his major to criminal justice when he saw the material that a friend was studying. Beau worked in law enforcement at two other agencies prior to joining his current agency in December 2020. Beau and his brother are both in law enforcement. He has a girlfriend with whom he spends most of his time when he is not at work; he has no children. Beau enjoys working out and staying active by participating in physical fitness activities. Beau spoke highly of his community and indicated that he appreciates the small-town appeal of living where he works. He stated that he also has good relationships with his coworkers, who are a close-knit group.

Bryn

Bryn is a female law enforcement officer with former military service and 10 years of law enforcement experience. She works at a rural county agency located near Columbus, Ohio. She has a vibrant and forthcoming personality that captures one's attention immediately. Bryn enjoys the outdoors, reading, and animals. She is not married. She has one child. Bryn acknowledged that she has a significant amount of stress given her role as a single parent, college student, and law enforcement officer affected by shift work. Beyond that, she is committed to her responsibilities and seems persevering in her endeavors. Bryn understands the stress of the job; she stated that even though she takes on more stress, she knows how to separate herself from her

law enforcement role. She also understands that some of her vices may contribute to greater stress and health risks. She indicated that she is ready for a career change, although she is unsure what that may be.

Finn

Finn is a male law enforcement officer with just under a year of service. He began his career as a firefighter but recently switched to law enforcement. However, he is still a part-time firefighter. Finn has a very happy and jovial personality. He smiled frequently during our interview and seemed genuinely pleased with his life and career. Finn is single and does not have any children. He enjoys hanging out with friends, exercising, and cooking. He acknowledged that law enforcement has inherent stressors, but he feels he does a good job managing the stress by working through issues and talking with others. Finn also has a very non-judgmental attitude toward others that helps him to be supportive of his peers and an impactful law enforcement officer.

Grady

Grady is a male law enforcement officer with 25 years of service at the same agency, a municipality located in a rural area close to Columbus, Ohio. He demonstrated a kind and relaxed demeanor as we talked. He also has former military service. Retirement is on the horizon, but he has no concrete plans or date for such. Grady is married and has children and grandchildren with whom he enjoys spending time. He also enjoys reading and fishing when time allows. Grady understands the stress of law enforcement work but reported that he thinks he deals with it well by processing it and not taking work home with him. He made it clear that his wife is a strong source of support for him, and the fact that they get along so well makes his life much better.

Greg

Greg is a male law enforcement officer with ten years of service at the same agency, a municipality located in a rural area near Columbus, Ohio. He has held multiple roles in law enforcement, as an instructor, in tactical operations, and in his current role as a supervisor. He seemed upbeat and happy to share his experiences as we talked throughout the interview. Greg is not married and does not have children. Greg reported that he and his family are very close. His health is a priority; he participates in many physical fitness activities and eats healthily. He enjoys law enforcement work but admits it is stressful and demanding, which is why he makes an effort to take good care of himself for the most part. Greg also takes his responsibility as a leader at his agency very seriously and tries to be supportive and set an example for others.

John

John is a male law enforcement officer with twenty-two years of service. John has always worked at his current agency, a state police agency whose headquarters are in Columbus, Ohio. He has a warm and professional demeanor and a willingness to serve others. John is married and has children. He enjoys coaching his children's sports activities and being outdoors. He seems to have a very close relationship with his immediate and extended family and a close peer. He also reported that an essential part of his focus is being available to his peers; thus, he is actively involved in his agency's peer support team. John understands the stress of law enforcement work and its toll. He manages such stress through solid supportive relationships and trying to maintain a health-conscious, winning attitude towards life.

Kam

Kam is a female law enforcement officer with ten years of service. Law enforcement is her second career, and she currently works at a rural county agency near Columbus, Ohio. Kam's

demeanor is kind and forthcoming, with a “call it as it is” philosophy that she does not hold back. She is married and has children and grandchildren. She enjoys do-it-yourself (DIY) projects and spending time with her family and her close and trusted friend. Kam acknowledged that she has bad habits but is admittedly stubborn and has no desire to change her lifestyle. She talked about effective methods she utilizes for managing the stress of law enforcement. She attributes much of her laid-back attitude to perspectives gained through life experiences. She indicated that others at work look up to her and can count on her. Kam mentioned more than once that her goal is to help people, which seems evident in the things we discussed throughout our conversation.

Michael

Michael is a male law enforcement officer with eight years of service. He started his career at a smaller agency but now works at a rural county agency near Columbus, Ohio. Michael is not married. He has one child. He demonstrated a professional, calm demeanor but appeared a bit reserved and apathetic during some points of the interview. Michael was open and appeared to be honest and forthcoming about the realities of law enforcement work. He is cognizant of the stress of law enforcement, as he has dealt with critical incidents over the last year. Michael acknowledges law enforcement work's inherent dangers and stressors and knows he can manage his stress better. Michael used to enjoy coming to work but indicated that this had changed recently. Michael may be experiencing some symptoms of burnout, so commonly found among law enforcement officers.

Robert

Robert is a male law enforcement officer with under three years of service. He works at a rural county agency located near Columbus, Ohio. After high school, he went to college and entered the police academy. Robert has a warm and friendly demeanor and indicates a strong will

to do his job well and be a good law enforcement officer. He enjoys fishing, shooting, working on home projects, and spending time with his family. Robert has a girlfriend. He does not have children. He is close with his family, especially his father, a former law enforcement officer. He acknowledged the stressors of law enforcement work but noted that he manages them by decompressing and leaning on his solid social support.

Rusty

Rusty is a male law enforcement officer with 14 years of service. After high school, he attended college and worked in the private sector before joining his current agency, a rural county near Columbus, Ohio. He works part-time as a firefighter/EMT (emergency management technician). He is married and has children. In his free time, he enjoys hunting, fishing, and golfing. He enjoys his family immensely and spoke extensively about spending time with them. Rusty reported he is laid-back and relaxed for the most part. He is familiar with the demands of law enforcement; however, he tries not to let the stress and demands of law enforcement work adversely affect him, and he tries to be an example to other officers in this regard as well.

Results

Theme Development

Law Enforcement Culture

Each interview began with an initial question that prompted the participant to share information about themselves and helped develop rapport between the researcher and the participant. The researcher took field notes and made a point to tell the participants that the brief notes were to remember important parts of the conversation. Further, the researcher also advised the participants that they were welcome to read any of the notes after the interview. The researcher noted that just before the researcher asked the first interview question, most

participants appeared a bit guarded and reserved; their shoulders were a bit raised, and their arms were crossed or resting on the table with their hands connected. Once they began talking, the researcher started writing, making some eye contact as the participant shared their responses. As the interview proceeded, the researcher asked non-threatening, follow-up questions, often about family life and hobbies. Once participants answered the first question and had an idea about how the interview would go, they appeared more relaxed and comfortable. Their shoulders relaxed a bit, they uncrossed their arms, and they sipped the beverages they had brought. Thus, an emerging theme indicated that consistent with traditional law enforcement culture, officers may initially practice somewhat reserved behaviors and some skepticism until they reach a point where they do not feel threatened and are comfortable opening up to others.

Participants also reported their ages and shared information about their upbringing, early and advanced education, and decision to pursue law enforcement work. Responses to this question included participants' years of service in law enforcement. In all but one of the interviews, the researcher specifically phrased the question: "Will you tell me a little bit about yourself, such as your background, years of service, hobbies, and family?" Coding of the data revealed a pattern among over half of the participants in the study; 60% mentioned years of service first (despite this being the second factor in the question). The researcher also noted from field notes and observations of body language and tone of voice that when participants discussed their years of service, they did so in a neutral, matter-of-fact manner. Regardless of the number of years of service, there was no indication of pride or achievement among any participants. For example, with just under a year in law enforcement (and former experience as a firefighter), John shared that "I have had less than a year in law enforcement." Greg noted, "I've been here for ten

years. The majority of my time here has been on third shift. [I have held] different roles in the department [*sic*].” As a seasoned law enforcement officer, John stated

“Twenty-two years of service. I have worked at three different positions just at my agency. I’ve got four kids and a wife, and I spend most of my time coaching, so that’s pretty much what I do; I work, and I coach [*sic*].”

Therefore, an emerging theme from this data suggested that law enforcement officers might first self-identify based on work-related factors (in this case, years of service), which may impact other variables evaluated in this study. Another pattern noted was that most participants (91%) spoke favorably about law enforcement work. Whereas two participants mentioned their intentions of seeking employment or moving on to another career soon, another participant, Kam, noted about her ten years in law enforcement, "I’ve loved it. I’ve loved every part of it. Hopefully, somewhere I’ve helped someone. That’s my goal [*sic*].”

The Value of Family and Family History

Participants also shared their marital status and whether or not they had children. From field notes and observations of facial expressions and tone of voice, participants appeared to enjoy informing the researcher about and discussing their spouses, children, and families. Thus, the patterns noted in body language and positive facial expressions (smiling, eyes bright and wide open) when discussing these people in their lives suggest the theme that, like many others, law enforcement officers place great value on their families. Participants also shared hobbies and extracurricular activities, and some mentioned their family history of cardiovascular health. A pattern that emerged from the data showed that all participants reported no history of cardiovascular health, and a small percentage (27%) reported a family history of CVD (on both maternal and paternal sides of the family). From observations, the researcher obtained

information about their sex and race. Patterns that emerged from this data showed that most participants were white males (73%).

Perceptions of Cardiovascular Disease Susceptibility in Law Enforcement

The researcher introduced the concept of a higher prevalence of CVD and lower life expectancy for law enforcement officers by asking participants their beliefs about why law enforcement officers may be at greater risk of CVD. The researcher coded the participant responses with various codes. A theme emerged that included frequent descriptions of law enforcement officer risk of CVD attributed to high levels of stress and trauma, the frequency of going from a sedentary to quickened responsive position (biological reactions), and compromised sleep quality likely caused by shiftwork (primarily third shift). They also mentioned inconsistent and unstable shift changes over time, constant negativity, and lifestyle factors such as a lack of a healthy diet and adequate exercise (Table 5). However, a prominent pattern among participants was that a majority (73%) cited stress as a reason for the higher rates of CVD in law enforcement.

Table 5. Contributors to CVD in Law Enforcement n=11

Factor	Reported by
Stress	73%
Trauma	9%
Poor Nutrition	36%
Caffeine Use	9%
Tobacco Use	9%
Poor Exercise/Not Physically Active	9%
Shiftwork/Poor Sleep	36%
Biological Responses	55%
Constant Negativity	9%

Michael noted that trauma and stress significantly impacts law enforcement cardiovascular health and pointed out that often, organizational stressors have a heavy influence on the stress experienced by law enforcement officers. He stated:

“We deal with a lot more trauma than most people should have to. So, we have that stress, stress when it comes to our administration in most places. I find it more stressful with the administration rather than dealing with most calls for service. Being at home and not being able to turn it off puts a strain on your home life, and you can’t really relax [*sic*].”

John iterated similar reasons that law enforcement officers may experience a greater prevalence of CVD than the general population and pointed to stress as the most significant contributor. He elaborated that on top of the stress, diet and shift work effects have an impact. He shared that:

“A lot of reasons, I would say. But probably the biggest one is stress. We know that stress adds...to increased risk. Your diet...because you work off shifts...and if you don’t pack your lunch, you have to eat whatever. And just working off shifts, in general. I’ve worked [many years] on midnights, and it’s just hard on your body [*sic*].”

From Grady’s perspective, the stress of law enforcement work is the most apparent cause of the higher prevalence of CVD in law enforcement. He noted that operational stressors could also carry over into home life. He explained that:

“I think the obvious is stress from not only work but the stress that work puts on you at home, you know, shift work, getting called out, night, holidays, weekends [but also] you get all the stress at work of dealing with difficult people, potential for violence, that dump of adrenaline when you’re in a high-speed car chase...But then you get that grief from your family because you’re not going to be at Thanksgiving [or a] ballgame, and that causes some issues with your spouse. [Also] our job can be sedentary, you sit in your car a lot, and you’re not active...and the diet can be obviously bad [*sic*].”

Other participants echoed the perspectives of the others about the biological responses frequently occurring in this line of work that they feel specifically impact the heart. Thus, another emerging theme is that participants are familiar with the biological responses (increased heart rate and what participants often referred to as “the adrenaline dump”) to critical incidents. They believe these responses contribute to the prevalence of CVD issues in law enforcement. For example, Beau described that:

“I feel like it’s more you are going from zero to a hundred in a matter of seconds because you’re sitting in a cruiser, and then all of a sudden when that call comes out, your heart rate goes [up]...a call can be civil and de-escalating and all of a sudden ramp back up, it is a lot on your heart. Plus, the sleep schedule and the shifts sometimes can definitely affect you too [*sic*].”

From a similar perspective, Avery stated that the reasons for the higher prevalence of CVD in law enforcement are the biological changes and the challenge of decompressing after a critical incident. She gave an example by describing a recent situation that she was involved in at work:

“We have so many highs and lows. So because we don’t know what’s going to happen in a general day...you could go from [a minor issue helping someone] and literally as I am talking to her, [I am called] to a fleeing homicide suspect just around the corner, so you go from calm and cool to a lot of stress, a lot of anxiety, heart rate’s up, and when everything is said and done then you gotta think about now I gotta keep pushing through even though you’re going through the adrenaline dump and the exhaustion of everything. Then you have to do a report and have a detailed narrative. They say that after retirement that because our body is so used to those highs and lows for so many years, when we go to retire, we don’t have that anymore, and that’s when our body goes into shock [*sic*].”

Additionally, participants cited lifestyle choices within and outside of the control of officers that take a toll on the body, which contribute to greater rates of CVD in law enforcement. Thus, another emerging theme from the coded data demonstrates that participants believe that shift work (an element beyond their control given the inherent nature of law enforcement work), as well as nutrition (challenged by the availability and convenience of options), impact the risk of CVD in law enforcement. For example, while Greg also suggested that the primary reasons for the higher rates of CVD in law enforcement can be attributed to biological reactions increasing stress levels, he also noted that sleep and shift work, in general, and food choices have an impact on officers. He described their higher risk of CVD as multifactorial:

“I think part of it, the majority of the shift, it’s a very sedentary job, you’re sitting in a car all day, but yes, you can have some highs. That’s another part of it, the high stress rates. There’s hormones and stuff produced in your body that are going to raise those stress levels. Sleep. Odd schedules. Not even just being on third shift but shifts all over the place...the food. The food is a big factor, especially for guys on second shift...eating fast food a lot [*sic*].”

Aligning with the other perspectives, Kam expressed the reasons for the high rates of CVD in law enforcement rather succinctly:

“Because we live on caffeine and nicotine, and we don’t eat properly, we eat when we can, where we can, and it’s not always the healthiest choices. We grab what we can on the go. And you go from zero to sixty [frequently], so I know why it is what it is [*sic*].”

Greater Stress in Law Enforcement

Given that a large percentage of participants cited stress as a contributing factor to the greater rates of CVD in law enforcement, the researcher coded participants’ various responses

about their perceptions of stress. The researcher first coded participants' responses to their perceptions of law enforcement stress to the general population (Table 6). The researcher then coded participants' reported overall stress (Table 7) and their reported overall stress compared to other law enforcement officers (Table 8).

Table 6. General Population Comparison n=11

LEOs Have Lower Stress	0%
LEOs Have Similar Stress	0%
LEOs Have Greater Stress	82%
LEOs Have A Different Kind of Stress	18%

Most (82%) participants reported greater stress levels than the general population and expressed various reasons for such. Michael reiterated that law enforcement stress is much greater than stress experienced by the general population and gave an analogy that provided perspective about the responsibilities and pressure of law enforcement work not typically demanded of the general population. His response to the comparison between the two was that law enforcement stress is:

“Much higher. Because of the things we have to deal with on a daily basis. You know the fact, if a normal person screws up at work, they get fired. If I screw up at work, I could die, one of my friends could to, or I could go to prison [*sic*].”

For John, there is not a close comparison of the two. He pointed to the higher stress levels that officers experience so frequently and the result of that constant stress over time. He described the stress level between law enforcement and the general population as this:

“It’s really not close. The stress levels that somebody in law enforcement faces; if you would scale it one to ten, their average stress level is probably a seven or an eight compared to the general public, which is probably a four or a five. So you don’t think

that's a big deal, but when you consistently do that day in and day out, it adds up, and it is eventually going to get you [*sic*].”

Positive Coping Mechanisms in Law Enforcement

Another emerging theme is that law enforcement officers accept that they have greater stress than the general population but feel they can control or utilize better coping methods than the general population. Kam mentioned that the frequency of constantly dealing with stress certainly affects officers. However, she also explained that law enforcement officers might cope differently with stress than the general population due to a different mindset.

“Well, we have a [certain] way of dealing with things...we have a different mindset. We do make jokes, and we make light of things, but I think that's how we cope with stress to get through things and deal with stress...I think officers have more because we have to respond more on a daily basis. They do not have to deal with stress on an everyday basis at the level that we deal with it [*sic*].”

Beau's position is similar to Kam's in that he also noted that law enforcement officers have more significant stress than the general population but have adaptive coping methods that ease the effects of such pressure. He explained the difference as such:

“I feel like it (sic) depends on how you deal with the stress. Because some [officers] deal with the stress [but], some don't manage it as great...I think officers get more stress because of the risk to their life and their health, but it also depends on how you deal with that stress [*sic*].”

Qualitative Differences in Stress Between the General Population and Law Enforcement

Another emerging theme is that law enforcement officers experience a different quality of stress rather than a lower or greater quantity of stress than the general population. Participants

based such differences from a qualitative perspective on the kind of stress experienced by the general population, which further suggests the theme that some law enforcement officers are sensitive to the fact that stress may be relative and subjective. For example, Grady indicated that law enforcement officers have more stress than the general population, but he also minimized the stress level compared to others. He shared:

“You know, each job has its own stresses. A person working at a steel factory has stress just like someone...here would. So, to compare them, we have different kinds of stresses...we put more stress on each other than sometimes the public [puts on us] because there’s the drive to go out and perform and make these stops and make these arrests. And don’t screw anything up so we get sued or you get hurt. Oh, and you better have your paperwork on par, or there’s gonna be issues. And there’s the scheduling issues. I am not saying we have the most stressful job, but we have definite stresses that might not apply to other people [*sic*].”

Further, some participants noted that they would not classify their stress in quantifiable terms compared to the general population. Robert explained it like this:

“I think it’s a different *kind* of stress. It just, you know, we, we’re seeing things, we’re dealing with things, it’s in our face and stuff. I think that sometimes people, especially, like, with their phones and all that stuff, and social media, I think that somebody sitting at home can cause themselves more mental stress, not more, but it’s just a different kind. We’re dealing with people, we’re arguing with people, we see things, car accidents, and shootings, and that’s the kind of stress that kind of sticks with you for a really long time, but I think a lot of the stress that the general population gets is anxiety...that can cause their body an extreme amount of stress, but ours is just different [*sic*].”

Bryn’s response aligned with the concept that stress differs between law enforcement officers and the general population. She described it as such:

“I would venture to say that it is probably the same level but different kind [of stress] as different psychological reactions...create different hormones and endorphins and things in your body that probably affect people differently so ...the guy who works in a corner office with stacks of paper on his desk probably experiences the same amount of stress that we do but a different *kind* of stress... it’s not like a life or death fight or flight stress; it is just a different form of stress [*sic*].”

Perceptions of Overall Stress Levels—Adaptive Coping Mechanisms

The researcher then coded the participants’ responses regarding their reported overall stress levels, on a scale of no stress, low stress, low-to-medium stress, medium stress, medium-to-high stress, and high stress. The reported overall stress levels of participants indicate that the majority (91%) of law enforcement officers rank their overall stress level between low and medium (Table 7). When the researcher equally divided the data from the 18% of participants who rated themselves at low-to-medium overall stress, a 9% adjustment to the low-stress and medium-stress categories changed the percentages to 27% and 64%, respectively, which suggests that the majority of participants rank their stress at a medium level.

Table 7. Overall Stress Rank n=11

No Stress	0%
Low Stress	18%
Low – Medium Stress	18%
Medium Stress	55%
Medium – High Stress	0%
High Stress	9%

Participants who reported that their overall stress is low or low-to-medium elaborated that they base their answers on positive coping mechanisms and perspectives. For example, Kam, who has ten years of service, noted that her overall risk is:

“Low. Because I do not let a lot of things bother me. And I know... I can’t change everything, and I can’t change all situations, and I know this, so I try to go into everything with an open mind to see what is going on [*sic*].”

Beau, who has 2.5 years of service in law enforcement, reports his stress to be low because he stays physically active and utilizes communication with others as a tool for decompressing and working through things that may be bothering him. He stated:

“I feel like it’s pretty minimal just because I have found those outlets [through exercise] and with talking with others. I have a brother in law enforcement, so we pretty much talk about day-to-day stuff that we don’t feel comfortable [talking with others about]...[so I would rank] in between low and medium [*sic*].”

Rusty, who has 14 years of experience, ranks his overall stress low because he has a laid-back and calming mindset that encourages him and others to relax and let the event fold out before overreacting. He described the reasons for his perspective as follows:

“I think it has come with experience to sit back, relax, go with the flow...when you’re new, some things may be a stressful situation. With years of experience, you just take your time and let it play out, and not let that stress get to you...and I have been able to stay relaxed [*sic*].”

Perceptions of Overall Stress Levels—"Medium. That's Where I Live"

Whereas some participants ranked their overall stress as low or low-to-medium, the majority (55%) rated their overall stress level as a medium. John, who has 22 years of service, blatantly described his overall risk as a consistent level:

“Medium. That's where I live, where I am every day just about. I think for me, I put a lot of pressure on myself. I [am an influence on] a lot of people, so I don't want to fail them, I don't want to fail at home, I don't want to fail in life in general...I don't want to lose that life, so I put that pressure on myself to perform and do it well [*sic*].”

Grady, who has 25 years of service in law enforcement, explained that his ranking of a medium stress level is based on his coping methods and using others' reactions to gauge how well he is handling his stress. He described his ranking as follows:

“I would say medium. I'm sure everyone says this. But I think I deal well with stress. Maybe I don't let it boil over where it causes issues with performance or relationships... using other people as a barometer... they don't say, 'You need to relax.' I think I do okay [*sic*].”

One participant, Michael, did not hesitate to share his overall stress level. Before the researcher could complete the question about overall stress level, he interrupted and responded with "High." When the researcher asked why he ranked his level as high, he quietly replied, "I've had a year." Michael explained that within the past year, he was involved in critical incidents and experienced compounding family issues, all contributing to greater stress.

Comparison of Stress Levels—Law Enforcement Mentality and Experience

The data also indicate a possible theme regarding the participants' similar perceptions of their overall stress level and other law enforcement officers' stress levels (Table 8). Most (91%)

of the participants perceive their stress to be lower or similar to other law enforcement officers, and just over half (55%) of the participants perceive their stress to be similar to other law enforcement officers. The theme that emerged from this data was the sense of shared experiences between officers and their belief that coping mechanisms, coupled with age and experience, significantly impact the outcome of stress effects.

Table 8. Overall Stress Comparison to Other LEOs n=11

I Have Lower Stress Than Other LEOs	36%
I Have Similar Stress As Other LEOs	55%
I Have Greater Stress Than Other LEOs	9%
I Have A Different Kind of Stress Than More Experienced LEOs (e.g., more years of service/rank)	27%
I Have Less Stress Than Officers in Agencies With Greater Call Volume/Critical Incidents	27%

Bryn ranked her stress level as similar to other law enforcement officers. She described a concept of shared experiences among this population and differences in how officers handle the situations. She also indicated that with age and experience comes a shift in mindset towards viewing things through a prioritizing lens based on what is most important. She identified with her peers by stating that:

“I would say, probably, we are all in the same mode. We all deal with the same things every day, and granted, everybody deals with things differently, but a coping mechanism doesn't necessarily comport with a stress level... I do think... age, maturity, and experience plays a part in that just because someone who has been doing this job for 20 years is going to get less stressed over certain things than somebody who has been here a year because it is just a matter of learning... to choose your battles [*sic*].”

John's comparison of his overall stress to other law enforcement officers was similar to the other participants' comparisons; however, he also elaborated that part of the everyday stress

experienced by law enforcement officers is part of their law enforcement identity. He stated that his overall stress level is similar to his peers "because everybody that I work with, we still have that same mentality...that carries over into your life...[the mentality] of not losing, being competitive [*sic*]." When prompted to elaborate on his mention of loss, he explained that losing encompasses everything law enforcement officers try to prevent:

"When you look at it from what we do...when we lose a person from a death, that's a [personal and professional] loss for us. We don't want to lose, so we take all that stuff on. That's why we do what we do because we want to prevent that stuff [*sic*]."

Comparison of Stress Levels Among Different Law Enforcement Agencies

Another theme that emerged was the participant comparison to other law enforcement agencies. Although Beau reported lower stress than other officers because of his ability to manage the stress of law enforcement work, he also mentioned that officers in other agencies might not be as fortunate as he is. He explained:

"[I have] lower [stress than other law enforcement officers] because some of them just hold it in and just let the stress tear them away over time. Especially in different agencies where they don't have the community behind them as much as we do, so I see that they deal with a lot more stress and have a lot more issues while being on duty which causes more stress for them [*sic*]."

Other participants iterated similar perspectives. For example, Finn commented about his overall stress compared to other law enforcement officers: "I would say everybody is about the same. We all experience the same things. Some people have higher call volumes and encounters with people who are trying to do dangerous things, so depending on the severity of what is going on in their area." Further, Greg reported that he believes his stress level is lower than others because

of good coping mechanisms, but also because his "agency does not have the high-stress calls for service as larger agencies [*sic*]."

Stress Management

Another emerging theme from the data indicates that law enforcement officers frequently use exercise and physical activities, communicating with others about stress, and spending time with others as stress management, which reflects their perceptions about their overall stress rank. The data indicate that participants who reported the same overall stress and CVD risk level utilize some of the same methods for managing both (Table 11). For example, participants with the same rank for both noted in their explanations of their stress management and how they manage their CVD risk that exercise is a factor. Further, each of these participants reported receiving traditional annual CVD testing. Eighteen percent of the participants reported low-stress levels and a medium CVD risk; the CVD risk management methods participants reported only include annual CVD testing. Their stress management methods include spending time with others outdoors and processing stress alone. On the other hand, other participants noted that exercise is not a method of stress management for them. Kam reported that she manages her stress by:

"I just scream inside my cruiser really loud [laughter]. No one is there, no one can hear it. It's out of the public view... during [my shift] when I am going to a call, and it's stress, I let it out before I get there. [The stress is generally because] it's the anxiety of you don't [know what is going to happen], and everything is there [and] built up...I don't work out. I don't do any of those things. My biggest relief once I get home if it's [been] very stressful, I just go to sleep [and sleep well]. I crash [*sic*]."

Other participants noted higher overall stress levels than their CVD risk. Avery and Robert reported similar responses; both said medium overall stress and low CVD risk. Their stress management methods included spending time with others and staying active. Their CVD risk management methods include staying active and getting annual traditional health screenings. Robert highlighted a component of his stress management involves spending time with others. He shared:

“I like to go and decompress by spending time with friends and family, just relaxing, doing nothing, or sitting and just talking, so that really helps me, and it doesn't have to even be about what's stressing me out. It can just be hearing and talking and seeing people that are my friends and family because, you know, I work second shift, I don't have weekends off...so just seeing people because I don't get to do it a lot, is just great for me, and it helps relieve my stress [*sic*].”

John also reported a medium overall stress level ("It's where I live") and a low CVD risk. He indicated that exercise is a method of stress and CVD risk management. Additional stress management includes communicating and processing the stress with others and obtaining annual traditional and advanced health screenings. John shared that his agency has a program where they provide health information to officers via video education that they can review on duty during their downtime. He stated:

“I used to exercise a lot when I was younger. Now that I am getting older, it is not so easy. The body breaks down. I do yoga and a lot of breathing exercises. Luckily in my agency, they [provide information about stress management, and we use it]... I've got a mentor... he and I debrief and talk a lot and are able to get stuff off our chest [*sic*].”

Michael shared that following the critical incidents and in response to a recent tough year, he chose to continue with professional therapy as a tool for stress management. He implied that he had utilized other methods, but they were ineffective. He shared:

“I go to therapy still from [the critical incidents] because after I dealt with that stuff, I realized how much stress I have to deal with, so I decided to continue that outside of here... I try to do calming exercises, but they don't really work [*sic*].”

Another participant who ranked overall stress as a medium but CVD risk as low noted maladaptive responses to stress. Bryn, who reported that she has no family history of CVD and gets annual traditional health screenings, shared that, along with therapy, she also uses tobacco and alcohol to deal with stress. She reported:

“Well...I take on more things to distract myself from the other things. I do probably drink more than I should... I do not drink [at all] on my workdays... On my days off... I stay in a constant buzz state, and I continue until I go to bed Saturday night... I haven't been drunk in several years. I just like to drink... I don't know if it is more of an anxiety thing. I think [it is an escape]. This job comes with its share of traumatic experiences... you just get tired, and I think... I am going to drink and not think about it [*sic*].”

Individual Cardiovascular Disease Susceptibility

The researcher asked each participant to rank their individual risk of cardiovascular disease (Table 9). One emerging theme was that every participant ranked their CVD risk within the low-risk to medium-risk range. Participants described several factors contributing to their perceived risk of CVD, including family history, stress, nutrition, caffeine, tobacco, alcohol, weight, exercise habits, shiftwork, and traditional CVD screening (Table 10). Participants did not

mention their history of CVD in these responses; however, 100% of participants reported no record of an individual CVD event.

Table 9. Self-Reported Risk of CVD n=11

No Risk	0%
Low Risk	45.5%
Low- Medium Risk	9%
Medium Risk	45.5%
Medium-High Risk	0%
High Risk	0%

Table 10. Contributors to Individual CVD Risk n=11

Contributing Factor	% of Participants Reporting the Factor Contributes to Greater CVD Risk	% of Participants Reporting the Factor Contributes to Lower CVD Risk
Family History of CVD	9%	18%
Traditional CVD Screening	0%	9%
Stress	18%	0%
Nutrition	18%	9%
Caffeine	27%	0%
Tobacco	18%	9%
Exercise/Physically Active	9%	36%
Weight	9%	0%
Shiftwork	18%	0%
Biological Responses	9%	0%
Physician Opinion	9%	9%

Beau reported his CVD risk as low-medium risk. He explained that biological responses outside of his control contribute to this ranking. "I feel like, with exercise and eating healthy, it does a lot. But also working night shift, and the caffeine...and stress, it is hard to avoid, so that definitely takes a toll."

Grady, who has 25 years of service and experience in law enforcement, ranked his risk as medium. He noted that he has no family history of CVD, but his physician advises that he weighs too much and has a poor diet. Grady's blunt response to his reasoning for ranking his risk as medium introduces the possibility that law enforcement officers may identify their CVD risk

using the same logic and rationale that non-law enforcement officers view. Grady stated he would rank his as a medium because "I'm 49, not 65. I realize anybody can have a heart attack at any time. There is not a lot of history of it in my family." Greg, who has ten years of experience in law enforcement and has primarily worked on third shift, reported his risk of CVD to be medium. He noted that he exercises and eats healthy and has no family history of CVD; however, his caffeine intake and poor sleep quality affect his risk. Greg explained that:

"I would say medium mainly based off three factors: family history, caffeine intake, and sleep...third shift, in general, puts [me] at a higher end. I try to balance that out by staying active, but I know those risk factors are still there [*sic*]."

Kam described that her caffeine and tobacco intake influence the reasoning behind her CVD risk ranked at medium. She also pointed out the biological changes impact her risk as well. Kam explained, "I'd say I'm a medium...you go from a low-key to an intense situation where you're driving fast to something you don't know what you're going into. I do drink energy drinks, and I vape, so I know my risks are there [*sic*]."

Other participants ranked their CVD risk as low. Like some of the other participants, Avery noted that biological reactions from going from a sedentary to an immediately active position contribute to her risk. Still, she stays busy, her physician has not indicated that she is at greater risk, and she has no family history of CVD. Rusty reported about his CVD risk: "I would say low. I work out all the time. I don't use any tobacco." Robert noted his risk is low because of positive and negative contributing factors. He described his reasoning for his risk as follows:

"I would say low risk. I use tobacco, so that's a negative... I know that can still affect heart disease. I was avid in sports. I don't get a lot of time to go workout, but I do like to

do a lot of activities outside. I consider my health to be pretty good... But I've never really suffered with weight issues, and I have always been active [*sic*].”

Bryn reported her CVD risk as low. She admitted that she has negative contributing factors to her risk but considers genetics are a large part of one's risk. She elaborated on her risk:

“I would say low... I have some vices. I've been, I [points to vape device on table]. I smoked for almost 15 years. I stray away from cardio as much as I possibly can. So, it's not like I am really working [out] very often. Unless I have to. I feel like my saving grace is that cardiovascular issues are not big in my family at all, either side [*sic*].”

John also reported a low risk of CVD. He explained that his agency requires a health and physical wellness screening every other year. Suppose the results from the screenings (that include lab work assessing cholesterol, triglycerides, etc.) indicate an issue. In that case, officers meet with physicians and nutritionists and establish a plan for mediating the problems identified. Age and health standards define the requirements for officers. Officers have three months to correct the issues and return for another screening. He gets traditional screenings with his primary healthcare provider in the off years. John explains his low risk as follows:

“I think, luckily for me, A) I exercise, so that helps, and B) we go through a program every other year for our agency, and they give us results of what we're doing well, what we're not doing well, they do all the blood tests...we've got a decent idea of where you sit and what your risks are [*sic*].”

Comparison of CVD Risk, Risk Factors, and Overall Stress

The researcher then analyzed participants' reported factors contributing to their individual CVD risk in comparison to their responses to the high risk of CVD in law enforcement and found that, whereas 73% of the participants cited stress as a contributor to the high rates of CVD

in law enforcement (Table 5), only 18% of participants cited stress as a contributor to their individual CVD risk (Table 10). These findings prompted the researcher to analyze participants' reported individual CVD risk (Table 9) compared to their overall stress levels (Table 7). The researcher noted that overall stress ranked as a medium and CVD risk rated as a medium by 55% and 45% of the participants, respectively. This pattern prompted the researcher to evaluate the data by examining contributing factors of the participants' ranked risk. Upon further analysis, the researcher found that 27% of the participants' perceived individual CVD risk levels aligned precisely with their perceptions of their overall stress rank (Table 11).

The researcher found that eighteen percent of participants' perceived CVD risk levels were higher than their reported overall stress levels (Table 11). These participants cited biological responses as contributing to law enforcement CVD risk. One of the participants also cited biological responses as a contributing factor to their individual CVD risk. This data introduces a potential theme that law enforcement officers manage their stress well but recognize that some risk is beyond their control. Further, the data also informs the theme that most law enforcement officers in the study undergo annual traditional physical health screenings (Table 12) and consider this screening part of their CVD risk management (Table 11). The data also revealed that over half (55%) of participants perceived their CVD risk levels to be lower than their overall stress levels (Table 11). Of the 55% of participants perceiving lower CVD risk levels than overall stress levels, 83% reported that stress impacts CVD risk for law enforcement officers (Table 11).

Table 11. Overall Stress, Individual CVD Risk, Risk Contributors

n=11

Participant-Reported Overall Stress	Participant-Reported CVD Risk	Participant-Reported CVD Risk Factors in Law Enforcement
Low-Medium	Low-Medium	Bio Responses, Stress, Sleep, Shifts
Medium	Medium	Bio Responses, Stress, Sleep, Shifts, Diet
Medium	Medium	Stress, Shifts, Bio, Family Stress
Low	Medium	Nutrition, No exercise, Bio Responses
Low	Medium	Caffeine, Nicotine, Bio Responses
Low to Medium	Low	Bio Responses, Nutrition, Sleep
Medium	Low	Bio Responses, Stress
Medium	Low	Stress, Negativity
Medium	Low	Stress
Medium	Low	Stress, Nutrition, Shifts
High	Medium	Trauma, Stress, No Shutting Off

Table 12. Annual Traditional CVD Screening

n=11

Yes	18%
No	82%

This data revealed the pattern that participants' overall stress scores and CVD risk scores both fall into similar categories (low risk to medium risk). However, upon deeper analysis, the data indicate a pattern that participants' perceptions about contributing factors to CVD risk in law enforcement include stress as a primary factor. Still, their individual CVD risk differs from their perceptions about their individual CVD risk. Additionally, most participants reported lower CVD risk than their reported overall stress level, despite their perception that stress contributes to CVD risk among the law enforcement population. This pattern informs the theme that law enforcement officers may acknowledge risk factors for others but do not apply such to themselves. Such a theme aligns with the common perception that things are bad for some people, but those things will not happen or do not apply to them. This theme is also present in traditional law enforcement culture that suggests principles of invincibility.

Table 13. Stress, CVD Risk, and Management

n=11

Overall Stress	CVD Risk	Stress Management Methods	Individual CVD Risk Management Methods
Low-Med	Low-Med	Exercise, Process With Others	Exercise, Diet, Annual Screening
Med	Med	Exercise, Yoga, Read	Exercise, Annual Screening
Med	Med	Check Out, Exercise, Read	Exercise Annual Screening
Low	Med	Outdoors, Time With Others	Annual Screening
Low	Med	Process Alone (Screams)	Annual Screening
Low-Med	Low	Check Out, Time With Others	Exercise
Med	Low	Exercise, Yoga, Process With Others	Exercise, Annual Screening, Stress Test Every 2 Years
Med	Low	Exercise, Time With Others	Active, Annual Screening
Med	Low	Time With Others, Shoot, Fish	Active, Annual Screening
Med	Low	Ignore, Alcohol	Active
High	Med	Therapy, Confide in Friend	Annual Screening

Controlling Biological Reactions to Stress

Aside from stress as a primary contributor to CVD risk in law enforcement officers, participants also reported an awareness of biological responses to stress. Sixty-four percent of the participants mentioned biological reactions, such as heart rate increase, breathing changes, and what many referred to as the "adrenaline dump" in their list of factors contributing to CVD risk in law enforcement (Table 11). Further, a large percentage (82%) of participants mentioned these biological reactions at some point in the interview process. Furthermore, some participants believe they can control involuntary responses to stress, while others insist they can control these responses. One participant reported that he could control everything except his sleep, which is very poor quality and quantity. Additionally, Greg noted that he could control such responses:

"Yeah, I can think of many examples. [When] I am in the office, [and] we get a pursuit, a fight, or whatever...I run out, jump in the car, and I can feel my heart rate go boom, boom, boom. As I'm starting the car and pulling out of here, I am doing the combat breathing, trying to get my heart rate under control, slow down, open up your vision, start trying to make clearer thoughts or decisions and then spend 30 seconds or so on that and

then start thinking about how you're going to respond to the call, where you need to be, and what's going on [*sic*].”

Other participants stated that they could control the biological responses sometimes. Rusty, for example, explained his response about his control over the reactions:

“Not Always. I think no matter how many times you get in a pursuit or foot chase, you're going to have that adrenaline jump, and your heart rate is going to climb... you can't keep your heart rate down for something like that because it's always something exciting and once that adrenaline dumps you can't always control that [*sic*].”

Avery and John reported similar perspectives in their explanations of controlling biological responses sometimes. John pointed out that "You can't change what you feel. But I think you can lower it and the effect of it...by breathing and things that you know for yourself, but, yeah, you can control part of it [*sic*]." Avery stated:

“I'd like to say, like, we're all type A personalities, and we get into this profession thinking, like 'Oh yes, I can control, I have control over this,' but I want to say no, like how my body reacts to a certain stressor or anxiety, I can, like, you can control so much, but I wouldn't say I can control all of it [*sic*].”

Other participants responded that they have no control over biological reactions. Kam noted that she has no control over these reactions. She shared her way of coping when they occur: "No. Because you can't. You have to breathe through it. It will give in a minute [*sic*]."

Bryn noted that people cannot control initial responses, but once they can process the situation, they have some control over themselves. She explained:

“To an extent, you can [control involuntary, physical reactions]. I would say that, not initially. Initially, something happens, you immediately react the way that you are

intended to react. That whole survival thing. But I think once you have a minute to realize what is going on around you, yes, you can control what is going on because it just takes your brain a minute to catch up [*sic*].”

Another participant emphatically responded that he has no control over biological responses or emotions associated with such. He explained that he had trouble controlling his emotional reactions after a particularly traumatic call. He stated that he believed this was good because it initiated his processing of the situation. He said that before that particular traumatic event happened, he may not have felt that way, but after experiencing it directly, he knows there are uncontrollable reactions to trauma. From this data emerged the theme that law enforcement officers may be aware of involuntary, biological reactions, and these factors may contribute to their perceptions of risk for law enforcement officers in general. However, the data indicate that most participants (91%) do not contribute biological responses to their individual CVD risks (Table 10).

Targeted CVD Mitigation, Education, Awareness

As previously noted, a large percentage of participants in the study reported that they get annual traditional health screenings (Table 12). The data further indicate that 82% of the participants reported that their physicians know their occupation (Table 14). An emerging theme amongst participants in the study showed that CVD education and awareness about specialized screenings were lacking in this group. Specifically, 0% of participants had received any CVD education (Table 15), and 0% were aware of any specialized CVD screenings (Table 16).

Table 14. Physician Awareness of Occupation n=11

Yes	82%
No	18%

Table 15. Participation in CVD Programs/Training n=11

Yes	0%
No	100%

Table 16. Awareness of Specialized CVD Screening n=11

Yes	0%
No	100%

Additionally, a pattern involving specialized CVD screening informed another theme about cues to action for participants (Table 17). Many participants mentioned that they would get a specialized CVD screening if they experienced symptoms. Many participants also said they would undergo a specialized CVD screening if their physician prompted it, which led to the introduction of a theme about the significance of physicians' influence on law enforcement officers. Thus, 91% of participants reported that if they experienced symptoms (45%) or their doctor ordered it (55%), they would get a specialized CVD risk screening. Rusty explained:

“If my doctors thought I needed it. When I went to leave the hospital after Covid, I had to do a walk study to check my heart rate and O2 stats [to be released], and during the walk study, just from me sitting down to standing up, my heart rate went to 160 [beats per minute]. So the nurse was worried, so she called the doctor, and the doctor said, 'He's young, his heart's good, just do his walk study with his heart rate that high if his heart rate is that high.' So, if they were worried about [my heart], they would've not done the study [*sic*].”

Table 17. Specialized CVD Screening Prompts n=11

I Would Get a Specialized CVD Screening If:	
I Started Having Symptoms	45%
My Physician Suggested It	55%
If It Was Publicly Available To Me	9%

Law Enforcement Demands and Culture

The data indicate that law enforcement work inherently comes with specific responsibilities and some unavoidable risks. Participants reported their lifestyle factors pertaining to their current assigned shift, nutrition, sleep quality, quantity, and exercise habits. For example, Michael, with his eyes down and the side of his head tilted and held with his fingers, said rather pragmatically in a soft voice: "It's not good. I average 3-4 hours per night...I can't turn my mind off [*sic*]." The researcher noted no apparent patterns or consistencies in the data about lifestyle factors (Table 18). Some researchers may expect reports of healthier nutrition and better sleep quality in participants who regularly exercise. They may logically expect that working the day shift equates to better sleep; conversely, night or second-shift participants may report poor sleep. However, although this is true for some participants in this study, there is no pattern or consistency in the data. Given what we know about the occupational demands of law enforcement and the effects of such on lifestyle factors, the researcher was not surprised by the lifestyle data. Thus, a primary theme that emerged centers more around the reality that LEO understand the necessity of a healthy lifestyle but do not always have the opportunity for such,

Table 18. Lifestyle Factors n=11

Shift	Diet	Sleep	Exercise
1	Unhealthy	Good	3-4 times/week
1	Fair	Bad	Sporadically
1	Healthy	Bad	3-4 times/week
1	Unhealthy	Bad	3-4 times/week
1	Unhealthy	Good	None
1	Unhealthy	Bad	None
1	Healthy	Good	2-3 times/week
2	Unhealthy	Good	None
2	Unhealthy	Good	3-4 times/week
3	Healthy	Good	5+ times/week
3	Healthy	Bad	5+ times/week

Another recurring theme emerging from the data is the mention of pressure in law enforcement work. Participants noted that, while societal pressure impacts them, sometimes the pressure comes from within their organization and occasionally from within themselves. For example, Finn noted that there is a constant worry about performing and doing better. He noted that he often finds himself second-guessing his work. He stated:

“A lot of people call me and remind me of my occupation. I [tell them] I'm not at work...I would say [I think about work when] it's a case that I have to deal with, that I made the arrest on, I am always like, 'Did I arrest them correctly? Did I always do the paperwork correctly? Should I have charged them more or on this or that [*sic*]?”

Grady expressed a similar perspective. He noted that the general public does not understand the fear of getting sued and, thus, the pressure to do everything right. John brought up the self-induced pressure stemming from maintaining a winning mindset. He noted:

“I think for me, I put a lot of pressure on myself. I [am an influence on] a lot of people, so I don't want to fail them, I don't want to fail at home, I don't want to fail in life in general... I don't want to lose that life, so I put that pressure on myself to perform and do it well [*sic*].”

Michael reiterated a similar perspective about the winning mindset utilized for law enforcement officer survival that may increase pressure on them. He explained:

“People ask me about [stuff], and tell them you always have to go in with a winning mindset. If you think you're going to lose, you lose. So, if it happens, it happens. But you always have to be prepared [*sic*].”

*Separation From the Law Enforcement Role*Table 19. *Effects of CVD Event* n=11

Factor	Non-Fatal %	Fatal %
Work	45%	18%
Family	55%	82%
Spouse	0%	18%
Child(ren)	0%	36%
Friends	0%	45%
Community	0%	9%

Another pattern that developed in the data analysis was the participants' foci on their law enforcement role and the effects of a CVD-related event (Table 19). When asked about the effects of them having a non-fatal heart attack or stroke, 45% of participants mentioned the event affecting their job or some work-related function. Whereas nine percent said they would not change anything about their life, 45% said that the event would be a wake-up call or shift in priorities. When asked how a non-fatal event would change her life, Kam said matter-of-factly, "I don't think it would. I think I am just too hard-headed and stubborn enough. I would just continue with my job until they made me quit [*sic*]." Some also mentioned that they would have to change careers. Beau noted that:

"With this career, I feel like it would, I'd have to leave, I'd have to find probably a new career because it would hinder more my safety not being able to protect myself and do the minimum and [handle] the daily calls [*sic*]."

Grady also mentioned the possibility that a non-fatal CVD event may contribute to disability from work. He explained:

"I've never thought of that. There would be the obvious, time off from work, whatever recovery or lasting issues there are with that. Maybe you don't recover or come back to

work...Probably unwanted changes in diet that would come with that. That's the 'oh yeah, there really is an issue here.' You can't ignore it when this happens [*sic*].”

When participants shared their perceptions of how a fatal event (such as a heart attack) would affect their life, 18% mentioned work (and mentioned it first) and the burden their death would place on their agency. Grady noted:

“I'll start with work. Obviously, somebody is going to have to do all the crap that I do...jump in to and try and finish. They're going to have to hire somebody else. Which I know they'll all be fine here. [But] my family, that would probably be I'd like to think, that would be a tough hit. We are all pretty close. My wife and I are pretty close [pauses as if pondering the question deeper], so that would be a hard pill to swallow [*sic*].”

Greg mentioned work as well and the effects on his peers. He explained:

It would affect the department, there would be a big shift...and also in the responsibilities would have to be divvied up. As far as family goes, it would have a big effect. I am pretty close with my mother, brother, and sister, all those...it would have an effect on them.

Also, a good thing is that I do not have [children] that I am responsible for, so it wouldn't have that effect [*sic*].”

The remaining 82% of participants did not mention work at all; they mentioned only their family and friends. Michael shared: "My family would be upset, and my son would not understand."

Bryn also mentioned the effects of her non-fatal cardiovascular event on her child and her mother. She shared that such an event would be "traumatic for an 11-year-old and would break my mom's heart." Kam stated that "My children would be upset. I think my husband would be upset. I think people would be devastated, that are close to me. But other than that, I am

replaceable." Beau mentioned the effects on his family and friends and the impact on his supportive community. He noted:

“Family and friends would take it very bad. I feel like it would affect the community because with [our community] it is such a close community. Pretty much everybody knows all of the officers by name. So, it's a real close community...like if a traumatic incident happens, everybody comes in and gives us cards or tells us how much they appreciate us...we are definitely very liked around here...Especially during [tough] times, this community still supported us. They backed us [*sic*].”

Avery noted that her family would be upset but also mentioned that her death would mean that there is one less person to help with chores and other responsibilities at home. She also mentioned that her best friend would be devastated. Robert's and Finn's responses described the effects on their close families. John shared that his wife and children would be affected the most. He said, "Well, I think it would probably affect my wife and kids the most. They wouldn't have a dad...I have a twin brother, so that relationship in and of itself [is also special] [*sic*].”

Thus, the themes that emerged from the data regarding law enforcement demands indicate that law enforcement officers may demonstrate traditional cultural norms emphasizing the feeling of always being on duty. Also, the data show the theme that although law enforcement officers may place heavy emphasis on their role as law enforcement officers, they also place great significance on their families. Participants also responded to the inquiry about their time off and mindset when they are not at work. Data analysis indicated a pattern with participants reporting that they frequently think about work when not on duty. Ninety-one percent of the participants said they think about work when they are not on duty. Many mentioned the pressure and residual effects of trauma, and others reported a sense of

responsibility to others. For example, Greg noted that he feels he is constantly on duty, checking emails, and wondering what is going on with him not there. Rusty explained that although he tries not to think about work, it happens. He indicated that he believes every law enforcement officer struggles with the situation where law enforcement officers who are not on duty are always on guard and watching their surroundings. Robert reported similar information. He stated he cannot shut his mind off. He is also skeptical of people and tries to stay alert and aware of what is happening around him. Beau shared a similar perspective:

“I am still fairly new, so it is hard to turn it off. You're always people-watching and looking at scenarios and everything. It's just hard to shut it off. You're always looking at the risk levels, watching our back. And [because some people are not as supportive of law enforcement] trying to keep my career private [*sic*].”

John explained that there is a constant feeling of being on duty, which stems from his drive to be available to others. He shared:

“Yes, and a lot more so recently [with added responsibilities]...it feels like I am always there...basically, I am on call 24 hours a day. I didn't have to do it. Basically, it is part of the peer team [program,] but I wanted to make sure I am available for our people [*sic*].”

The patterns emerging from this data indicate that male law enforcement officers in the study may struggle more than females when it comes to completely checking out of their law enforcement role. Not all of the participants reported that they dwell on their thoughts. Kam said, "I do replay some of the things in my mind that has gone on throughout the day, but as far as it keeping me awake or something like that, no [*sic*]." Thus, another pattern that emerged from the data revealed that 66% of the female participants reported thinking about work sometimes but

did not let the thoughts harbor. They each reported that they could maintain separate roles between law enforcement and home life.

Social Support

The researcher also asked participants to share information about their relationships. Participants shared who they spent the majority of their time with and who they confided in. Most (91%) of the participants said they spend most of their time with their family and friends. Some find that their time with their loved ones also serves as stress management. Robert noted, "My family and I are very close, which helps a lot with my stressors." Rusty shared similar sentiments about his family: "With my girls, just being home with them. Knowing I came home to them is just relaxing in itself."

Several participants shared that their family and friends show concern for them if they sense the participant is overly stressed. Robert shared that he often confided in his girlfriend and father; he shared that his girlfriend is very understanding. He noted:

My girlfriend tries to give me alone time and... talk with me... [she recently] just told me 'you're stressing out.' I had worked 16 hours straight, it was a lot of arguing with people, and I just got home, and she asked, 'Why are you wired? Shouldn't you be tired?' And it's because I was frustrated from the whole day. She understands that sometimes it is just better if I isolate myself [pushes hand out away from his body, indicating a distance and separation] and just do something that I want. Sometimes it is better to just talk to [my partner] [*sic*]."

Other participants noted that friends within and outside of law enforcement support them. They reported that often, people ask them what is going on and talk with them. They reported that people call and check on them or tell them to take time off. Two participants indicated that they

do not have many of these support systems. They stated that some friends reach out, but the participants avoid or ignore them and shut them out, respectively. These participants reported medium and high stress, respectively.

Of the participants with spouses or partners (45%), 80% mentioned that they confide in that person. The participants who confided in their spouses or partners reported sharing details about work with them but not in full detail. To protect their partners from the trauma of the job, participants reported that they left out detailed descriptions of the events. Grady said that he confides in his wife but "tries not to dump too much stress on her." John reported similar information in his account of how much information he gives his wife. When asked who he confides in outside of work, with a deep conviction and softer facial features, he shared:

“My wife. She knows everything. Sometimes she doesn't want to know everything, but that's what she gets...whether it's a shooting that happened or a fatal incident that I'm on. She'll know exactly what it was. It hasn't always been that way. Over the years, I've learned if I don't talk about it, then things aren't well at home. She doesn't get the 'Rated R' version, she gets the 'Disney' version. But she knows what's going on, so she understands that some things affect me differently than others [*sic*].”

The underlying themes resulting from the combined social support and fatal CVD event data indicate that law enforcement officers comprehend their value on their families and friends. They also understand the severity and impact of a CVD-related death on their loved ones, whom they greatly value.

Spiritual Influence on the Demands of Law Enforcement

Table 20. Overall Stress, CVD Risk, Spirituality

n=11

Participant-Reported Overall Stress	Participant-Reported CVD Risk	Spiritual Factors Reported as An Influence On Law Enforcement Demands
Low-Medium	Low-Medium	None
Medium	Medium	None
Medium	Medium	God, Church
Low	Medium	None
Low	Medium	God, Prayer, Karma
Low to Medium	Low	God, Jesus, Prayer
Medium	Low	Prayer, God, Jesus
Medium	Low	God, Prayer
Medium	Low	Jesus, Prayer/Conversation
Medium	Low	God, Prayer, Faith
High	Medium	None

Given the topics covered in the interviews on law enforcement demands, the researcher asked a final question about spirituality in law enforcement (Table 20). The researcher was careful not to use any specific religion or prompt participants in any way. The data analysis revealed that a majority (64%) of participants utilize spiritual factors as a coping mechanism for dealing with the demands of the profession. Of that 64%, 100% percent of those participants mentioned God or Jesus in their responses and discussed how this impacts how they do their job. Finn reported:

“Like I told the lady today that I took to jail...Everybody is a human...everybody makes mistakes. I believe in God. God sacrificed his life for everybody. And everybody sins here and there, so you forgive and forget. Life is too short to hold a grudge on somebody. [I pray before work,] a little one just to make sure I return home and be able to do everything that I am supposed to and after thanking [Him] that I am still here and able to return home and be with family and friends [*sic*].”

The researcher also analyzed the data on spiritual factors compared to their overall stress levels and CVD risks (Table 19). There were no noticeable or consistent patterns that emerged from this analysis. However, the researcher noted that of the 45% of participants who ranked their stress level as lower than their CVD risk levels, 80% listed spiritual factors as influencing how they manage the demands of law enforcement. Of the influence of spirituality as an influence on the way he manages law enforcement demands, John stated:

“100%. I am a Christian, and my belief is really strong. I put a lot of faith and a lot of trust in God, so that allows me to live the way I want to be. When you live a life of prayer...it takes some of that stress away. If you have true faith. That's important to me [*sic*].”

Research Question Responses

The first research question in this study asked: How do law enforcement officers perceive their cardiovascular disease risk? The findings from this study revealed that law enforcement officers perceive their CVD risk within the low-risk to moderate-risk range based on traditional CVD risk factors such as family history, physical activity, nutrition, and physician opinion. Law enforcement officers perceive the high rates of CVD in law enforcement as a result of several factors, namely stress. Although their perceived stress levels are similar to their perceptions of their peers' stress levels, law enforcement officers do not perceive stress to contribute to their individual CVD risk.

Law enforcement officers perceive their individual CVD risk via the same lens as traditional cardiovascular risk awareness, including positive protective factors such as undergoing annual traditional cardiovascular disease screening, good health, physical activity, and not using tobacco or alcohol. One participant (Greg) ranked his CVD risk "mainly based off

three factors: family history, caffeine intake, and sleep... third shift in general puts [me] at a higher end. I try to balance that out by staying active, but I know those risk factors are still there." Another participant (Robert) reasoned, "I don't get a lot of time to go workout, but I do like to do a lot of activities outside. I consider my health to be pretty good...and I have always been active." They perceive the risk of CVD in law enforcement based on biological responses such as increased heart rate, breathing changes, and narrowed vision. They are aware of what several participants referred to as the "adrenaline dump." They also perceive the high rates of CVD in law enforcement due to stress associated with the unique demands of law enforcement work.

Law enforcement officers' individual CVD risk perceptions differ from their perceptions about the high rates of CVD in law enforcement. Specifically, although they attribute the high rates of CVD in law enforcement to stress, they do not perceive stress as a factor in their CVD risk. They perceive their overall stress levels as similar to their peers' but perceive law enforcement stress, in general, to be greater than the stress of the general population. Furthermore, law enforcement officers perceive their individual CVD risks as lower than their overall stress level. John, who ranked his overall stress level as medium and his CVD risk as low, explained that there are several contributors to the higher rates of CVD in law enforcement. Still, he believes "...probably the biggest one is stress. We know that stress adds...to increased risk [*sic*]."

Law enforcement officers may perceive their risks of CVD via the lens of traditional police culture that often promotes the idea that law enforcement officers must always be vigilant and on duty. Several participants indicated that part of their stress (which they perceive as contributing to CVD in law enforcement) results from constantly thinking about work. Law

enforcement officers may be unable to entirely or frequently check out from their law enforcement role. This extreme vigilance and constant pressure must be exhausting for law enforcement officers and may create dissonance in the battle between serving others while taking care of themselves. John's sentiments iterated such a concept when he shared, "...it feels like I am always there...basically, I am on call 24 hours a day. I didn't have to do it...but I wanted to make sure I am available for our people." John's implication about his desire to help and serve others is not uncommon among law enforcement officers. This mindset may explain why law enforcement officers subconsciously minimize their risks in the name of service but at the expense of their health, which may indicate why participants in this study reported their overall stress as high but their individual CVD risk as low.

The second research question in this study asked: How do law enforcement officers mitigate their cardiovascular disease risk? The findings indicate that law enforcement officers directly mitigate their CVD risks by being physically active, having good nutrition, and having annual traditional health screenings. These methods align with conventional health education and practices that promote healthy living. The results also indicate that law enforcement officers mitigate their individual CVD risks similarly to managing their stress. Thus, law enforcement officers' stress management methods, such as having and utilizing their social supports, may indirectly mitigate their CVD risk. This study also indicates that law enforcement officers do not typically receive CVD education, nor do they know of specialized CVD screenings available to them. This lack of CVD education and awareness may explain a lack of understanding about the control and long-term impacts of physiological, involuntary reactions on the CVD health of law enforcement officers.

Law enforcement officers generally mitigate their CVD risk via traditional methods that promote positive cardiovascular health. For example, a large percentage of participants (82%) get annual standard cardiovascular health screenings. Additionally, participants reported that they exercise and practice healthy eating habits to lower their CVD risk. One participant noted that he exercises and eats healthy to compensate for the uncontrollable factors associated with law enforcement. Beau explained that "... with exercise and eating healthy it does a lot. But also working night shift, and the caffeine... and stress, it is hard to avoid, so that definitely takes a toll." Another participant, Greg, shared that he exercises and eats healthy and, fortunately, has no family history of CVD. He believes he is at a medium risk of CVD due to his caffeine intake and poor sleep quality.

Law enforcement officers may mitigate their risk of CVD by using stress management methods. Law enforcement officers frequently exercise as a form of stress management, which may directly impact their CVD risk. They also highly value their families and consider time with them and in the outdoors effective stress management. Therefore, stress management methods may have iatrogenic effects on mitigating CVD risk. Another participant, John, reported that he manages his stress by confiding in, and communicating with, others. He explained that:

"I used to exercise a lot when I was younger. Now that I am getting older, it is not so easy. The body breaks down. I do yoga and a lot of breathing exercises. Luckily in my agency, they [provide information about stress management, and we use it]... I've got a mentor... he and I debrief and talk a lot and are able to get stuff off our chest when we need to [*sic*]."

The study's findings revealed the importance of social support in law enforcement. Despite all of the negative attributes of the work, law enforcement officers cherish their

relationships with loved ones above all else. One law enforcement officer presented with a fairly somber tone throughout the interview. However, when asked who he spends most of his time with, Michael emphatically and joyfully said two simple words: "My son."

Law enforcement officers may mitigate their risk of CVD through reliance on their faith. Law enforcement officers have a religious foundation based on Christian principles. These principles include a service mindset, practicing forgiveness in their personal and professional lives, and utilizing prayer as an effective tool for dealing with law enforcement demands. Bryn shared that she will frequently "drive down the road and me and Jesus have a talk. I have those moments... Me and Jesus have a little talk after... I just have a conversation [with Him]. Me and Jesus talk [*sic*]." Thus, such spiritual practices and influences may mitigate the risk of CVD for some law enforcement officers.

Of the mitigation methods utilized by law enforcement officers concerning their CVD risk, the data suggests that law enforcement officers do not mitigate their CVD risk through CVD education or specialized screenings. Because 100% of the participants reported never having programs or training on CVD education, nor were they aware of any specialized screenings, there is an inference that law enforcement officers do not mitigate their risk of CVD via these methods. Conversely, this inference does not transfer to the entire law enforcement population. Although law enforcement officers are very much aware of the biological responses to involuntary, physiological reactions of stressors (e.g., increased heart rate, changes in breathing and vision) and believe that they can control such, participants may not fully understand their inability to control the biological reactions causing such responses. Law enforcement officers do not participate in any CVD programs or training and are unaware of any specialized CVD screenings. The data indicate that most participants (91%) would undergo such screening if they

experienced symptoms or if their physician advised them to do so. Waiting to address an issue or until a doctor makes an order is not a novel concept specific to the law enforcement population, as many non-law enforcement officers likely do the same. The idea of not dealing with a problem until it starts interfering with daily life aligns with the oft-reported concepts of 1) discerning and accepting what one can and cannot control and 2) ignoring a minor problem until it becomes a bigger problem. This method may work for the general population and in many contexts; however, for law enforcement officers exposed to the innate functions associated with their line of work, such a mindset may be related to the high rates of CVD among this population. Thus, reducing the prevalence of CVD among law enforcement officers requires targeted intervention, explicitly aimed at law enforcement officers, that educates them about their elevated risk factors and methods of mitigating such risks.

Summary

This chapter included findings from the qualitative study that sought to answer the following research questions: 1) How do law enforcement officers perceive their cardiovascular disease risk? 2) How do law enforcement officers mitigate their cardiovascular disease risk? This chapter began with an introduction to the participants and their backgrounds. Through information collected via detailed interviews, field notes, and close observations, the researcher organized and coded the data in preparation for data analysis. Following a rich description of the collected data, the researcher then provided the evaluation and analysis that revealed patterns and informed themes related to the risk and mitigation of cardiovascular disease among law enforcement officers. The chapter concluded with a solid report of the findings that answered the research questions and prepared for the discussion, implications, and recommendations of the research study.

CHAPTER FIVE: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Overview

This qualitative case study aimed to explore law enforcement perceptions of cardiovascular disease risk and their health behaviors mitigating such risks. The researcher aimed to answer the research questions: 1) How do law enforcement officers perceive their cardiovascular disease risk? 2) How do law enforcement officers mitigate their cardiovascular disease risk? Via detailed interviews with law enforcement officers, followed by in-depth data analysis, the study revealed that law enforcement officers have a general understanding of what factors may contribute to the high risk of cardiovascular disease in law enforcement, and they follow traditional methods of mitigating such. This chapter comprises a summary and discussion of the findings, including implications in light of the relevant literature and the health belief model theory. This chapter also includes implications, delimitations, limitations, and future research recommendations.

Summary of Findings

This study found that law enforcement officers perceive themselves at a low risk to moderate risk of cardiovascular disease. The basis for their perceptions of the high rates of CVD in law enforcement depends on traditional risk factors (family history, lifestyle, and traditional CVD screening results). Their perception emphasized the role of stress and its pertinence in improving law enforcement health. However, even though law enforcement officers reported greater rates of stress than the general population and elevated individual and law enforcement-aggregated stress levels, their perceptions of their individual CVD risk did not include stress as a contributor to such risk. This study also found that law enforcement officers mitigate their CVD risks via traditional methods (being physically active, having good nutrition, and having annual

standard health screenings) and that their stress management methods may indirectly help mitigate their CVD risks. Law enforcement officers have not participated in any program or training regarding CVD education, nor are they aware of any specialized CVD screenings. The findings revealed that traditional law enforcement culture components might impact CVD risk perceptions. The study also highlighted the value of social support and faith among law enforcement officers.

Discussion

Empirical Literature Comparison

The current study corroborates much of what we know about the prevalence of CVD in law enforcement. Like other research, the present study extends the research on the relationship between stress and its role in law enforcement health. Several researchers have uncovered the prevalence of CVD among the law enforcement population (Gendron et al., 2018; Meena et al., 2018; Gonzalez et al., 2019; Thayyil et al., 2020; Violanti et al., 2018b; Violanti et al., 2020; White et al., 2019). The current study diverged from other research in that it evaluated law enforcement officers' perceptions of the prevalence of CVD in law enforcement and their perceptions of their individual CVD risk.

Some findings from the current study corroborated previous research. For example, other scholars (Baldwin et al., 2019; Magnavita et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018; Violanti et al., 2017; Violanti et al., 2020; White et al., 2019) indicated positive associations between stress and CVD in law enforcement, with several studies pointing to the correlations between individual stress and clinical risk factors. The current study extended existing literature by evaluating individual perceptions of stress and comparing their personal stress to their perceptions of the stress of other law enforcement officers and the general

population. Individual stress perceptions included several factors commonly found in the existing literature. For instance, as noted in several studies (Holst et al., 2019; Magnavita et al., 2018; Purba & Demou, 2019; Santa Maria et al., 2018), participants in the current study referenced operational stressors such as exposure to death, human suffering, trauma, violence, shift work, and disrupted activities. They noted the impact these factors have on their well-being and the prevalence of CVD in law enforcement. Furthermore, paralleling with other studies (Andrew et al., 2017; Purba & Demou, 2019; Queiros et al., 2020; Santa Maria et al., 2018; Violanti et al., 2016), participants in the current study cited organizational stressors such as unsupportive leadership, poor management, and bureaucratic frustration. Corroborating research by other scholars (Chan and Andersen, 2020b; Houdmont, 2017; Magnavita et al., 2018), participants noted that such stressors often weigh more heavily on them and have a greater impact on their health and job satisfaction.

The current study also extended the literature in the field concerning stress perceptions compared to their perceptions of others' stress. Whereas one study (Grego & Fischetti, 2018) found that participants reported lower perceptions of overall stress compared to the general population, the current study found that participants reported greater perceptions of stress than the general population. In the present study, participants indicated that stress is not a quantifiable factor but is unique to law enforcement and, thus, different from the general population. The current research suggests that law enforcement officers acknowledge greater or different stressors than the general population, which may relieve some of the obstacles to psychological intervention, such as fear of stigmatization and career satisfaction noted by Haugen et al. (2017). Further, other empirical literature (Grego et al., 2018; Shiozaki et al., 2017, Thayyil et al., 2018) indicates that law enforcement officers' perceptions of their stress levels do not always align with

their clinical risk factors. Although the current study did not examine clinical risk factors, the law enforcement officers based their CVD risk on their reported clinical risk factors. Also, the officers' overall stress perceptions did not align with their perceptions of their CVD risk, which corroborates the existing literature that reported stress levels do not always parallel clinical risk factors.

Findings from the current study also confirm existing literature on the value and importance of community and social support of law enforcement officers. Participants in the current study emphasized their satisfaction and gratitude toward their close-knit, supportive communities. However, some indicated that they are often in a place of hypervigilance and sometimes shield their occupational identity from others for fear of being targeted. This finding aligns with other research that suggests law enforcement officers experience deeper scrutiny (Clifton et al., 2018; Nhan et al., 2019) and the threat of attacks (Clifton et al., 2018) as a result of intense police-public tensions. However, the current study revealed positive police-public relations, which may indicate decreased social avoidance commonly found in law enforcement work (Violanti et al., 2018b).

The current study also corroborates the literature regarding the impact of social support on law enforcement officers. The existing literature provides ample evidence that solid social support positively affects the physical and psychological health of law enforcement officers (Clifton et al., 2018; Santa Maria et al., 2018; Violanti et al., 2017). Although the current study could not confirm the importance of social support as it pertains to cardiovascular disease risk

noted by Violanti et al. (2017), it revealed that most law enforcement officers reported strong personal relationships with their family, friends, and peers.

The current study also extended the literature on the role of spiritual support in law enforcement. Although religious perspectives are not widespread in law enforcement research, the current study evaluated the role of spiritual influences on law enforcement support and coping. The existing literature (Clifton et al., 2018) points to the positive correlations between law enforcement officers who rely on their social support systems and self-help methods to those who use prayer as a coping mechanism. Other scholars (Blumberg et al., 2018) pointed to spirituality as a mediator of law enforcement stressors. The current study corroborates the existing literature. Participants reported that religious influences, specifically their reliance on God, their relationship with Jesus, and their use of prayer, impact how they manage law enforcement demands and how they live their lives.

Theoretical Literature Comparison

Based on concepts of the health belief model theory (HBM) (susceptibility, severity, barriers, benefits to intervention, and cues to action), the current study supports the theory that these elements work congruently to explain and understand the CVD health of law enforcement officers. Additionally, the current study also sheds new light on the component of benefits and barriers to intervention. The HBM theory suggests that individuals' subjective perceptions about a health problem, in this case, CVD risk, influence their health behaviors (Champion & Skinner, 2008; Rosenstock, 1966/1974). Participants ranked their respective CVD risk based on their perceptions of susceptibility to CVD based on traditional CVD risk factors. Participants also reported that a CVD-related illness or death would significantly impact them and their families. Their perceptions of their susceptibility and severity of CVD factored in their direct mitigation of

CVD—traditional methods such as annual CVD screenings and positive lifestyle choices. Aligning with the HBM theory, participants' perceptions of the benefits of CVD intervention combined with their perceptions of barriers to CVD intervention and factored into their mitigation methods. Participants also emphasized that their cues to take action would directly result from the presence of symptoms or directives from their physician. The current study findings align with the theoretical constructs suggested by the HBM theory and emphasize the necessary changes required for CVD intervention among law enforcement. Thus, this research advances the narrative of the importance of safety and wellness in law enforcement and makes a strong implication regarding the necessity of targeted CVD education and strategies for reducing the rates of CVD among this population.

Implications and Recommendations

Theoretical Implications

The results of the current study align with the principles of the HBM. From a theoretical standpoint, this study suggests that law enforcement officers base their CVD risk primarily on their perceptions of susceptibility to such, and they mitigate their CVD risk based on the presence of traditional risk factors. Participants rank their individual risk of CVD as low despite citing stress as a factor in overall CVD risk in law enforcement and reporting moderate rates of individual stress. Participants also indicated that a CVD-related illness or death would be extremely severe for their families. The results suggest that law enforcement officers understand the importance and impact of traditional health screening and a healthy lifestyle. Results further indicate that some of the barriers to CVD intervention identified by participants include unique characteristics of law enforcement work (high stress, shift work, toll on the body). Law enforcement officers recognize that some elements of the intervention are beyond their control if

they choose to stay in law enforcement. Thus, they moderate their risks directly through traditional methods. Law enforcement officers may mitigate their CVD risks indirectly via reported stress management methods. Serving as primary cues to action, law enforcement officers value input from their healthcare providers; participants said that they would undergo specialized CVD screening if their physician directed them to do so. The results of this study revealed that participants' perceptions and mitigation of their CVD risks parallel the concepts of the HBM theory.

Empirical Implications

The results of this study align with the existing empirical evidence concerning the relationship between stress and law enforcement CVD health. Prior research indicates the high risk of CVD in law enforcement correlates to increased stress rates among officers (Gendron et al., 2018; Meena et al., 2018; Gonzalez et al., 2019; Thayyil et al., 2020; Violanti et al., 2018b; Violanti et al., 2020; White et al., 2019). Researchers and practitioners cannot ignore the impact of stress on health. As Brunetti et al. (2020) impressed, stress is an invisible enemy impacting cardiovascular health. However, given the inherent nature of law enforcement work, law enforcement officers may be able to manage their stress, but they cannot completely control it. There is a distinct relationship between stress and CVD among law enforcement that we cannot ignore. Much empirical evidence supports a better understanding of the correlation between these factors.

This study also diverges from much of the existing literature in that the focus on perceptions shifts the conversation from a researcher's to a practitioner's point of view. This study placed value on the perceptions of law enforcement officers through their lived experiences. For example, law enforcement officers understand the impact of stress management

on their health. This understanding aligns with research by Lees et al. (2019) that found that education intervention for law enforcement that targeted occupational stress and coping strategies positively impacted officers. Additionally, law enforcement officers perceive stress as a primary contributor to CVD among the law enforcement population, but they may not attribute stress to their individual risk. Law enforcement officers also perceive their individual CVD risk from a traditional lens of CVD risk, which does not include a thorough understanding of involuntary, biological reactions to stress that may contribute to CVD. As Collins et al. (2017) pointed out, risk perception alone may not reduce CVD. However, the results of this study indicate that law enforcement officers, like the general population, base their CVD risk on what they know, not on what they do not know. Thus, additional empirical evidence regarding targeted interventions may uncover a deeper understanding of the prevalence of CVD in law enforcement.

Practical Implications

The current study indicates that law enforcement officers understand and mitigate their risk of CVD based on traditional risk factors. Although they report greater stress than the general population, and they believe stress factors into the prevalence of CVD in law enforcement, they base their individual risks of CVD on the presumption that if they exercise, eat well, and follow the doctor's orders, their risk of CVD is lower. These findings are positive, as they indicate law enforcement officers are grasping the reality that law enforcement CVD risk exists.

They also understand the impact of stress and the importance of stress management. Other positive practical implications from the study revealed that law enforcement officers highly value their social support, and some rely on their faith to manage the stress of law enforcement. They actively participate in their supportive communities and demonstrate a

passionate commitment to service. Thus, law enforcement officers should continue utilizing their current methods of mitigating and enhancing their relationships with others. Another favorable and practical implication of the present study is that law enforcement officers obtain annual traditional health screenings and follow their medical providers' advice. This finding prompts the question of whether medical providers are aware of the greater prevalence of CVD in law enforcement and how they can assist in the mitigation of such. Thus, researchers, policymakers, law enforcement leaders, and medical practitioners should all be having collaborative conversations about the problem and ways we can reduce law enforcement cardiovascular disease and death.

Law enforcement officers perceived the risk of CVD in law enforcement based on biological responses such as increased heart rate, breathing changes, and narrowed vision. Other practical implications of the current study indicate that law enforcement officers may not wholly understand the involuntary, biological reactions resulting from frequent stressors associated with daily law enforcement work. Although existing empirical evidence (Chan & Andersen, 2020a; Violanti et al., 2006) demonstrates that people cannot control the biological reactions causing such symptoms, law enforcement officers may believe they can. Furthermore, they may not understand that these frequent reactions lead to dysregulated hormone levels and cause long-term problems over time (Andrew et al., 2017; Chan & Andersen, 2020a; Planche et al., 2020).

Further, all participants reported no history of CVD, which may factor into their perceptions of susceptibility. As the Bayesian theorem indicates, the absence of evidence does not necessarily eliminate the probability of an event (Taroni et al., 2019). Therefore, the lack of a history of CVD or other traditional risk factors does not mean that CVD risks do not exist. Thus, education aimed at teaching law enforcement officers about their specific risks and advanced

screening options may reduce such risks and decrease the prevalence of CVD among this group of people.

The current study also indicates that, although law enforcement culture may be changing in good ways, many officers may still perceive their health risks are lower than actual. From their exposure to traditional law enforcement culture, law enforcement officers may perceive their individual CVD risks differently than other law enforcement officers. Such principles of this traditional culture often emphasize bravado and toughness (Bullock & Garland, 2017; Ingram et al., 2018; Violanti et al., 2017) at all costs, including minimizing or ignoring health issues.

Emerging from the concept of traditional police culture is a similar concept identified from this study that law enforcement officers may develop or exacerbate a comparative cognitive response (CCR). In their frequent comparison of themselves to other law enforcement officers, they may believe that other officers are worse off than they are due to higher or more severe call volumes. Law enforcement officers operating with a CCR may not feel justified in their complaints about the inherent stressors of law enforcement or the byproducts of such. Thus, officers may minimize these effects or subconsciously believe they are not worthy of disclosing, discussing, or even acknowledging problems associated with the demands of law enforcement that may be affecting them. People may likely adopt the CCR from a very early age, from the parent who admonishes their child with "I'll give you something to cry about" to the youth group leader who reminds us that "someone else has it far worse than you do." This mindset carries on into adulthood, relationships, and careers and ultimately may prohibit law enforcement officers from viewing themselves as human. Thus, law enforcement officers must have permission to accept and process such realities of this line of work. Cardiovascular education that informs the learner about the scientific validity of such involuntary, physiological reactions may: 1) permit

them to first identify as a human being, 2) shift the internal locus of control to an external locus of control (thus relieving the pressure associated with feelings of having to maintain control at all times), and 3) increase awareness about the long-term impacts of such reactions on the human body over time.

Recommendations

As in any line of work and life, education is critical and foundational. Through targeted actions, we must continue pushing the agenda that law enforcement safety and wellness are a priority. Because the evidence points to the effectiveness of stress management methods slowly becoming more commonly discussed among law enforcement, we must continue encouraging such practices. Additionally, because law enforcement officers understand and mitigate their CVD risk based on traditional factors, we must introduce education that informs law enforcement officers about the greater prevalence of CVD and specialized methods of mitigating such. Further, law enforcement CVD education should encompass various perspectives from multiple disciplines.

Although traditional screenings and risk management are excellent tools for identifying and mitigating risk, these methods alone may not be enough to reduce the prevalence of CVD among law enforcement. Additionally, to promote the safety of law enforcement officers, we must encourage and create opportunities for advanced CVD screenings among the entire law enforcement population. The increased data-driven approaches (Cruz, 2020) should make evidence-based education a reality among this population. Further, multi-disciplinary leaders should collaborate to set standard guidelines for specialized CVD screenings for law enforcement officers. Encouraging and providing advanced screenings for law enforcement officers would set a standard of care and prioritize safety.

Limitations and Delimitations

The researcher made purposeful decisions regarding the criteria for the study. The researcher limited the participant sample to a small sample size that only included active participants and full-time law enforcement officers in Ohio law enforcement agencies. The decision to utilize a small sample size was to capture an in-depth, detailed analysis of the phenomenon. Further, the decision to exclude all non-law enforcement officers was because the subject of the study pertained specifically to the cardiovascular health of law enforcement officers. Additionally, the researcher excluded inactive police officers due to unknown factors related to their inactivity (e.g., employed at another occupation, involuntary dismissal, retirement, disability, administrative leave, etc.). The rationale behind this decision resulted from the researcher's inability to discern the reasoning behind the inactivity.

Further, because much of the empirical literature on cardiovascular disease among the law enforcement population includes full-time, active police officers, the researcher chose this sample group to stay aligned with existing literature. Additionally, the researcher narrowed the focus to full-time, active participants because there may be differences in perceptions and mitigation of cardiovascular issues among samples outside of the selected participant population (i.e., full-time active officers may have different perspectives than part-time or inactive officers). To further define the scope of the study to one location in the United States, the researcher selected participants employed at Ohio law enforcement agencies. While this somewhat limited generalizability to other states, the limitations are minimal due to the homogenous nature of law enforcement work within the United States. The average age of participants in the study was 34 years old. All participants were white; 73% were male, and 27% were female. Although the

participants' demographics may limit generalizability to other sex and races, the data aligns with the existing empirical literature on cardiovascular health among the law enforcement population.

Other limitations of the study include potential threats to credibility, dependability, and confirmability. Although these threats are minimal, they do exist. By nature, every qualitative study faces threats to credibility as it is inherently subjective. Other potential limitations include threats to credibility resulting from recall or inaccurate reporting bias. The participants in the study may not clearly or accurately remember elements of their lives during the interviews. Additionally, given the voluntary nature and subject of the study, healthier participants may have been more inclined to participate than others. Furthermore, to satisfy the researcher's questioning, the participants may have responded with answers they believed to be pleasing to the researcher. Other potential threats to credibility exist because there may be some unknown variables unknown to the participant that influence their perceptions of risk and health behaviors as they pertain to cardiovascular disease.

This study also included potential limitations to dependability and confirmability. The progression of the time component raises the issue of dependability. If a different researcher replicates the study, their study may reveal different results. Suppose the same researcher conducts the examination again later with the same group of participants. In that case, responses to the questions may differ due to changes over time (such as years of service), circumstances (such as an adverse health event, increased awareness, etc.), or other unknown variables. Furthermore, this study has minimal threats to confirmability because of the subjective nature of the qualitative inquiry.

Recommendations for Future Research

Although empirical evidence suggests law enforcement officers are at a greater risk of CVD-related illness or death than the general population, this study found that law enforcement officers perceived themselves to be at low to moderate risk of cardiovascular disease. The study also revealed that law enforcement officers attribute the high rates of CVD in law enforcement to stress. Law enforcement officers reported greater overall stress than their reported CVD risk. Additionally, they perceived and moderated their risks based on traditional risk factors (family history, lifestyle, and traditional CVD screening results). They also perceived some level of control over biological responses to involuntary, physiological reactions, but they did not articulate any detailed understanding or specific knowledge of the latter. Whereas this study contributed to the existing literature, the results warrant additional investigation of the prevalence of CVD among law enforcement.

A longitudinal, qualitative, and participatory action research case study focused on a specific intervention aimed at CVD risk may uncover information about accurate risk perceptions and effective mitigation. The current qualitative case study focused solely on a small sample size that evaluated participant perceptions of CVD risk and the mitigation of such. Additional qualitative studies focused on specific biological reactions (e.g., the frequently activated HPA system causing dysregulated cortisol levels) may provide insight into the understanding and impact of such biological responses and CVD risk. In this study, researchers could evaluate the short- and long-term effectiveness of a program aimed at CVD prevention or mitigation. This study would warrant a larger sample size and possibly a mixed methods design.

Whereas the current study focused on an exploratory design, another suggested approach is a phenomenological case study. In this type of study, researchers would have early awareness

of participants with a CVD diagnosis. For example, researchers could apply a cross-sectional design by examining a small cohort of law enforcement officers directly affected by cardiovascular disease or illness. This kind of study would allow researchers to explore specific individuals affected by CVD and provide insight into symptoms that contributed to the diagnosis and treatment and mitigation options. This type of study may include active or retired law enforcement officers. The study could also be longitudinal so researchers could evaluate the effects of CVD on the officers' careers over time.

Additional recommendations for future research include a quantitative case study that evaluates CVD risk and intervention among law enforcement officers. To maximize sample size, researchers could distribute surveys and collect data that captures different elements specific to CVD risk in law enforcement. Researchers could then compare demographics, risk perceptions, and mitigation methods among law enforcement officers. Depending on the responses and the geographical location of the study, this type of research could provide insight into the overall risk perceptions and mitigation of CVD among the entire law enforcement population. Additionally, a future study that applies a quantitative analysis, such as Bayes' theorem of probability (Hagiwara & Shirowa, 2022), could potentially provide evidence that may impact decisions about the direct mitigation of CVD for law enforcement officers.

Other suggested future research includes a mixed-methods case study examining the effects of specialized CVD education and screening on participants' risk perceptions. In this study, participants would receive specific education about various elements related to CVD risk for law enforcement. Participants could later be required or given the option of undergoing specialized CVD screening that revealed clinical risk factors present. This study would evaluate individual risk perceptions (qualitative design) compared to their clinical risk (quantitative

design) and provide additional evidence potentially supporting the need for advanced CVD testing among the law enforcement population.

Summary

The goal of this study was to contribute to the literature that could positively impact the lives of law enforcement officers, their families, and the communities they serve. This study was a qualitative, exploratory case study that examined law enforcement officers' perceptions of CVD risk and their mitigation methods. The study revealed that law enforcement officers understand and mitigate their CVD risk based on traditional risk factors. Although their perceptions of their CVD risk are misaligned with their perceptions of their overall stress levels, they are doing good things to support their health—getting annual traditional CVD screenings, exercising, confiding in their loved ones, and relying on their faith to deal with the demands of a tough job. The study also revealed that law enforcement officers do not participate in any CVD programs or training and are unaware of any specialized CVD screenings. Therefore, a multi-disciplinary approach that encourages and provides CVD education and specialized screenings specifically to law enforcement officers may affect the prevalence of CVD among this population. Thus, this study's conclusion may also be an introduction to making law enforcement health a top priority.

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APPENDICES

Appendix A Permission Request and Approval Letter

Appendix B Participant Recruitment Letter

Appendix C Participant Recruitment Follow-Up Letter

Appendix D Consent Form

Appendix E Interview Questions

Appendix F Cardiovascular Health Information Handout

Appendix A

Permission Request and Approval Letter

Dear Chief/Sheriff [name inserted],

I hope this letter finds you and your colleagues safe and well. As a fellow law enforcement officer and a graduate student in the School of Government at Liberty University, I am conducting research to better understand the cardiovascular health of law enforcement officers. The title of my research project is Law Enforcement Cardiovascular Health: A Qualitative Study on Law Enforcement Officers' Risk Awareness and The Targeted Mitigation of Cardiovascular Disease.

I am writing to request your permission to recruit two to three members of your agency for participation in my research study. Participants will participate in an in-person, one-on-one interview regarding police work and cardiovascular health. Taking part in this study is completely voluntary, and participants may discontinue participation at any time. Participants will be presented with informed consent information prior to participating.

I am deeply concerned about the prevalence of cardiovascular disease among the law enforcement population and hope to work with your agency on this project. Thank you for considering my request. A permission letter document is attached for your convenience.

If you choose to grant permission or have any questions about this study, please respond by email to [REDACTED] or contact me at [REDACTED] by October 17, 2022.

Sincerely,
Gretchen Lapp
Liberty University

Dear Gretchen Lapp,
After careful review of your research proposal entitled Law Enforcement Cardiovascular Health: A Qualitative Study on Law Enforcement Officers' Risk Awareness and The Targeted Mitigation of Cardiovascular Disease, I have decided to grant you permission.

Check the following boxes, as applicable:

- I will provide our membership list to Gretchen Lapp and Gretchen Lapp may use the list to contact our members to invite them to participate in her research study.
- I will not provide potential participant information to Gretchen Lapp, but we agree to send her study information to active law enforcement officers on her behalf.
- I give permission for Gretchen Lapp to utilize a private conference room in our agency to meet with participants and conduct her interview.

Sincerely,

Appendix B

Participant Recruitment Letter

Dear Ohio Law Enforcement Officer,

I hope this letter finds you and your colleagues safe and well. As a fellow law enforcement officer and a graduate student in the School of Government at Liberty University, I am conducting research to better understand the cardiovascular health of law enforcement officers. The title of my research project is Law Enforcement Cardiovascular Health: A Qualitative Study on Law Enforcement Officers' Risk Awareness and The Targeted Mitigation of Cardiovascular Disease.

I am writing to invite eligible participants to join my study. To qualify as a participant, you must be an *active, full-time, certified Ohio law enforcement officer* employed in an Ohio law enforcement agency. Participants will be asked to participate in an in-person, one-on-one interview regarding police work and cardiovascular health (approximately 30-45 minutes).

Names and other identifying information will be requested as part of this study, but the information will remain confidential. Taking part in this study is completely voluntary, and participants may discontinue participation at any time. A consent document, that contains additional information about my research, will be emailed to you. If you choose to participate, you will need to type your name and the date on the consent document and email it to me prior to attending the interview.

To participate or if you have any questions about this study, please respond by email to [REDACTED] or contact me at [REDACTED] by October 17, 2022.

Sincerely,

Gretchen Lapp
Liberty University

Appendix C

Participant Follow-Up Recruitment Letter

Dear Ohio Law Enforcement Officer,

I hope this letter finds you and your colleagues safe and well. As a fellow law enforcement officer and a graduate student in the School of Government at Liberty University, I am conducting research to better understand the cardiovascular health of law enforcement officers. A few weeks ago, an email was sent to you inviting you to participate in a research study. This follow-up email is being sent to remind you to respond if you would like to participate and have not already done so. The deadline for participation is November 1, 2022.

I am writing to invite eligible participants to join my study. To qualify as a participant, you must be an **active, full-time, certified Ohio law enforcement officer** employed in an Ohio law enforcement agency. Participants will be asked to participate in an in-person, one-on-one interview regarding police work and cardiovascular health (approximately 30-45 minutes).

Names and other identifying information will be requested as part of this study, but the information will remain confidential. Taking part in this study is completely voluntary, and participants may discontinue participation at any time. A consent document that contains additional information about my research will be emailed to you. If you choose to participate, you will need to type your name and the date on the consent document and email it to me prior to attending the interview.

To participate or if you have any questions about this study, please respond by email to [REDACTED] or contact me at [REDACTED] by November 1, 2022.

Sincerely,
Gretchen Lapp
Liberty University

Appendix D

Consent Form

Consent

Title of the Project: Law Enforcement Cardiovascular Health: A Qualitative Study on Law Enforcement Officers' Risk Awareness and The Targeted Mitigation of Cardiovascular Disease

Principal Investigator: Gretchen S. Lapp, PhD Candidate, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be a certified, active, full-time law enforcement officer employed at an Ohio law enforcement agency. Taking part of this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

The purpose of this research is to explore police officers' perceptions of their cardiovascular disease risk and their health behaviors mitigating such risk.

What will happen if you take part in this study?

If you agree to be in this study, the researcher will ask you to do the following things:

1. Participate in an in-person, one-on-one, audio-recorded interview regarding police work and cardiovascular health (approximately 30-45 minutes).

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study. Benefits to society include that the information obtained in the study may be used for targeted cardiovascular intervention for law enforcement officers that improves their health and occupational performance.

What risks might you experience from being in this study?

The risks involved in this study include a minimal risk of psychological harm to participants that may result from responding to questions invoking an emotional response. The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life. The only other known potential risk to participants is a breach of confidentiality if the data is lost or stolen but this risk is extremely minimal given the use of pseudonyms as well as the researcher's commitment to protection and storage of the data.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be kept confidential through the use of pseudonyms. Interviews will be conducted in a location where others will not easily overhear the conversation.
- Data will be stored on a password-protected computer on an external hard drive in a combination safe that only accessible to the researcher. The data may be used in future

presentations. After three years, all electronic records will be deleted and all physical records will be shredded.

- Interviews will be audio-recorded and transcribed using transcription software only accessible to the researcher. Recordings will be stored on a password-protected computer for three years and then deleted. Only the researcher will have access to these recordings.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address or phone number included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Gretchen Lapp. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at [REDACTED] or [REDACTED]. You may also contact the researcher's faculty Chair, Dr. John Bentley at [REDACTED].

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy of the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

The researcher has my permission to audio-record me as part of my participation in this study.

Printed Subject Name

Signature & Date

Appendix E

Interview Questions

1. Will you tell me a little bit about yourself, such as your background, years of service, hobbies, and family?
2. As mentioned, the focus of this study is law enforcement cardiovascular health. How would you rank your heart disease/attack risk: no risk, low-risk, medium-risk, or high-risk, and why?
3. Have you had a heart attack or stroke in the past?
4. How would/did you having a serious health condition such as a non-fatal heart attack or stroke change your life?
5. If you died from a heart attack today, how do you think this would affect others?
6. There is suggestive evidence that law enforcement officers experience greater rates of heart issues and have lower life expectancy compared to the general population. Why do you think this is?
7. I am sure you are familiar with the occupational stressors of your work; how do you think stress levels compare between the general population and most law enforcement officers, and why?
8. Where would you rank your overall level of stress on a scale of none, low, medium, and high, and why?
9. Compared to other law enforcement officers that you know, how would you rank your stress level on a scale of lower, similar, or greater?
10. The body responds to stress in different ways, and sometimes involuntary, physiological reactions occur. Do you feel that you can control these types of reactions?

11. Given what we know about the stress of law enforcement, there has been an increase in focus on stress management training such as resiliency, mindfulness, etc. What kinds of things do you do to manage your stress?
12. Can you describe how other people show their concern for you if they think you are overly stressed?
13. Who do you confide in within and outside of work?
14. What can you tell me about your eating habits, and what factors influence your choices?
15. What can you tell me about your sleep habits, and what factors influence your choices?
16. What can you tell me about your exercise habits, and what factors influence your choices?
17. How often do you take additional time off (such as comp time or vacation)?
18. Who do you spend most of your time with when you are not at work?
19. When you are off-duty, do you still feel as if you are on-duty or find yourself thinking about work?
20. Shifting gears a bit, how often do you get traditional health screenings such as blood pressure, cholesterol, etc.?
21. Does your primary healthcare provider know your occupation; if so, does this ever factor into decisions about your healthcare?
22. Have you ever participated in any programs or training focused on heart health?
23. Are you familiar with any specialized cardiovascular disease screenings?
24. Under what circumstances would you consider getting a specialized cardiovascular disease screening?
25. Do you have any spiritual influences that impact the way you manage the demands of law enforcement?

Appendix F

Cardiovascular Health Information Handout



LAW ENFORCEMENT CARDIOVASCULAR HEALTH

KNOWLEDGE

- Cardiovascular disease-related death and injury are **prevalent** for LEOs¹
- Average age of **heart attack** for LEOs occurs at 49 years old²
- **Lower life expectancy** than the general population³
- **Involuntary, physiological reactions** from stress build up and affect heart health⁴

MITIGATION

SCREENING. TRADITIONAL VERSUS ADVANCED

Traditional testing generally covers metabolic risk factors. Talk with your healthcare provider about relatively *inexpensive, easy* **advanced scans** that look for indicators of cardiovascular disease, such as:

- Coronary calcium CT scan
- LP-PLA2 blood test
- C-Reactive Protein blood test
- Echocardiogram

LIFESTYLE. Make necessary changes to your:

- Food choices
- Sleep quality
- Stress reactions
- Exercise habits

TRAINING. Find what works for you:

- Running/weightlifting
- Fitness/gym memberships/discounts
- Stress management
- Mindfulness/Resiliency

¹ Violanti, J., Fekedulegn, D., Shi, M., & Andrew, M. (2020). Hidden danger: A 22-years analysis of law enforcement deaths associated with duty-related illnesses (1997–2018). *Policing: An International Journal*, 43(2), 330-344. <https://doi.org/10.1108/PIJPSM-07-2019-0109>

² Sheinberg, J. (2020, November 22). Officer wellness and heart disease. *Cordico*. <https://www.cordico.com/2020/02/13/officer-wellness-and-heart-disease/>

³ Violanti, J., Fekedulegn, D., Hartley, T., Andrew, M., Gu, J., & Burchfiel, C. (2013). Life expectancy in police officers: A comparison with the U.S. general population. *International journal of emergency mental health*, 15(4), 217–228. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4734369/>

⁴ Violanti, J., Charles, L., McCanlies, E., Hartley, T., Baughman, P., Andrew, M., Fekedulegn, D., Ma, C., Mnatsakanova, A., & Burchfiel, C. (2017). Police stressors and health: a state-of-the-art review. *Policing*, 40(4), 642-656. <https://doi.org/10.1108/PIJPSM-06-2016-0097>

VITA

Gretchen Sue Harvey Lapp is a doctoral candidate with the Helms School of Government, pursuing a Ph.D. in Criminal Justice Leadership. Gretchen was raised in Urbana, Ohio. She attended Urbana University, where she earned a Bachelor of Science with honors degree in Criminal Justice. She earned a Master of Science with honors degree in Criminal Justice from the University of Cincinnati. Gretchen has held various roles within the criminal justice system and served on a range of boards and committees. Gretchen is a passionate advocate for children and prioritizing the health of public safety officers. She and her family live in West Liberty, Ohio.