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# The Relationship between Personal Factors, Work Factors, PTSD, and Suicide Ideation in Emergency Medical Service Providers

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THE RELATIONSHIP BETWEEN PERSONAL FACTORS, WORK FACTORS,  
PTSD, AND SUICIDE IDEATION IN EMERGENCY MEDICAL SERVICE  
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A Thesis  
Presented to  
The Faculty of the Department of Public Health  
Western Kentucky University  
Bowling Green, Kentucky

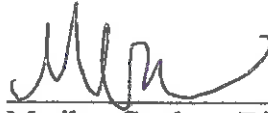
In Partial Fulfillment  
Of the Requirements for the Degree  
Master of Public Health

By  
Faith Joy Boldt

August 2016

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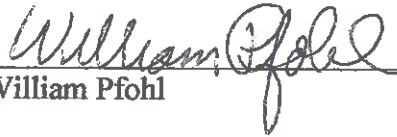
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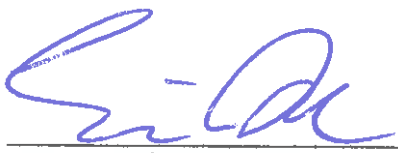
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7/5/16

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Date

I dedicate this thesis to my late father Arthur Charles Boldt who was my constant champion and to my mother Sylvia Coatney Boldt who is the backbone of my support system.

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Department of Public Health

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EMS providers work in a high-stress environment and are routinely exposed to critical incidents. Many providers are left to deal with the chronic stress on their own, either because of lack of effective employer-based programs or a culture that discourages its use. The extent to which these factors -- as well as personal characteristics such as resilience, PTG, and coping skills -- influence PTSD and suicide ideation among EMS providers has not been well studied among EMS providers. An online survey was administered to a convenience sample of EMS providers. Of the 2,683 respondents, more than one quarter (27.7%) met the PTSD criteria of 50 or higher on the PCL-M. Close to half of the respondents (42.0%) reported having contemplated suicide in the last six months. Of those who had contemplated suicide in the last 30 days, nearly one third (27.1%) thought about suicide 10 or more days in the last 30 days. EMS culture and resilience were negatively associated with PTSD, while positive associations were found with some coping styles. PTSD scores and suicide ideation frequency were highest when post-incident services were not available in the workplace. No significant relationships were found between personal factors and suicide ideation.



## Chapter 1

### **INTRODUCTION TO THE STUDY**

The work of an Emergency Medical Service (EMS) provider can be quite grueling. Many EMS providers face vehicular accidents, traumatic injuries, murders, and suicides on a consistent basis. Emergencies occur without warning, and EMS providers have to be ready to respond within seconds. If an EMS provider has been active in the field for more than five years, chances are they have been emotionally, physically, professionally, and spiritually assaulted. They are among the “walking wounded” (Meehan, 2013, para.5).

These critical incidents contribute to Post Traumatic Stress Disorder (PTSD) symptomology (Donnelly, 2012). PTSD prevalence is an estimated 15-20% in EMS personnel (Beaton, 2006). This is almost twice as high of the 7-8% prevalence of PTSD in the general U.S. population (U.S. Department of Veteran Affairs, 2015).

PTSD raises suicide risk (Erich, 2014). In a recent survey on critical stress of EMS providers 37% of the respondents had contemplated suicide and 6.6 % had actually attempted suicide ((Newland, Barber, Rose, & Young, 2015). In comparison, the national average of suicide contemplation is 3.9%, and the national average of suicide attempts is 0.6% (Centers for Disease Control and Prevention, 2015).

#### **Risk Factors for PTSD among EMS Providers**

EMS culture compounds the psychological risks from trauma (Erich, 2014). Once EMS providers put on the uniform, they are expected to be strong and not show weakness. The EMS provider must make sure that they are not “the weak link” of the company (Erich, 2014). Often EMS providers hide their feelings because they believe if they share with co-workers, they will be made the focus of demeaning jokes (Newland et

al., 2015). Some EMS providers even feel like they will be fired if they share their feelings with management (Newland et al., 2015). Poor coping skills can also increase PTSD symptomology, especially social avoidance, worry, (Pieterzak, Harpaz-Rotem, & Southwick, 2011) mental disengagement, wishful thinking, rumination, suppression, and dissociations of memories (Clohessy & Ehlers, 1999).

### **Protective Factors for PTSD among EMS Providers**

Conversely, there are some factors that may be protective against PTSD. Resilience, the ability to “bounce back” from difficult experiences (American Psychological Association, 2015), lowers the risk of developing PTSD (Gunderson, Grill, Callahan, & Marks, 2014). Traumatic events can also lead to post-traumatic growth (PTG), the “positive psychological change experienced as a result of the struggle with highly challenging life challenges (Tedeschi & Calhoun, 2004). PTG may be a protective factor against PTSD, as those who develop PTG use adaptive coping skills while maladaptive coping skills are used by those who develop PTSD (Moran, Burker, & Schmidt, 2013). Positive coping skills such as planning (Oginska-Bulik & Kobylarczyk, 2015) and positive reappraisal, acceptance coping, and religious coping (Prati & Pietrantonio, 2009) have been found to lead to PTG.

The workplace culture can also have a protective effect. Newland and colleagues reported that suicide contemplation was 50% lower and suicide attempts were 66% lower among EMS providers who felt that they were in a supportive and encouraging environment (Newland et al., 2015). While providing and encouraging use of post-incident services (PIS) -- such as Critical Incident Stress Debriefing (CISD), Critical Incident Stress Management (CISM), and Employee Assistance Programs (EAPs) -- can

contribute to a supportive workplace environment. Research on the effectiveness of PIS is mixed (Bledsoe, 2003; NetCE, 2013; Newland et al., 2015). Regardless, many EMS worksites do not offer such programs (Newland et al., 2015).

### **Purpose of the Study**

EMS providers work in a high-stress environment and are routinely exposed to critical incidents. Many providers are left to deal with the chronic stress on their own, either because of lack of effective employer-based programs or a culture that discourages its use. The extent to which these factors -- as well as personal characteristics such as resilience, PTG, and coping skills -- influence PTSD and suicide ideation among EMS providers has not been studied among EMS providers. The purpose of this study, therefore, was to explore the relationship of these factors and begin a line of inquiry to inform future public health initiatives. To this end, the following null hypotheses were tested:

H0<sub>1</sub>: There will be no association between personal factors (resilience, PTG, and coping skills) and PTSD symptomology.

H0<sub>2</sub>: There will be no association between personal factors (resilience, PTG, and coping skills) and frequency of suicide ideation in the last 30 days.

H0<sub>3</sub>: There will be no association between EMS culture and PTSD symptomology.

H0<sub>4</sub>: There will be no association between EMS culture and frequency of suicide ideation in the last 30 days.

H0<sub>5</sub>: There will be no difference between PIS and PTSD symptomology.

H0<sub>6</sub>: There will be no difference between PIS and frequency of suicide ideation in the last 30 days.

## Chapter 2

### **REVIEW OF RELATED LITERATURE**

#### **Background of EMS**

The field of EMS is relatively new. The first nationally recognized curriculum for EMS-emergency medical technician-ambulance (EMT-A) was published in 1969, and is considered by many the birth of modern EMS (Edgerly, 2013). The impetus for creating a modern EMS came about through “the White Paper” *Accidental Death and Disability: The Neglected Disease of Modern Society* presented to President Lyndon B. Johnson in 1966. The focus of the report was that accidental injuries were becoming one of the top causes of death in the United States, and it looked at the ineffectiveness of prehospital emergency care and the lack of regulation or standards in ambulance operation and training (Edgerly, 2013). Up until this point, only a Red Cross Advanced First Aid card was the most that was required. Also, many ambulance services were run as a side business of funeral directors (Crabtree, 2009). Now there over 826,000 licensed and credentialed EMS professionals in the United States (National EMS Management Association, 2016).

#### **EMS Certifications**

There are four main EMS certification levels: Emergency Medical Responder (EMR), Emergency Medical Technician (EMT), Advanced Emergency Medical Technician (AEMT), and Paramedic. EMRs are certified first responders. EMRs usually complete 40-60 hours of training in CPR, use of Automatic External Defibrillators (AED), oxygen administration and other skills such as splinting, bandaging, and

emergency childbirth (LifeMed, 2016).

EMTs usually have 150 hours of training and in addition to the training EMRs receive, EMTs receive training in non-visualized airways, blood glucose level testing, and the administration of the following: nitroglycerin, epinephrine in the use of an Epi-Pen, and activated charcoal. AEMTs complete the EMT course plus an additional 250 hours of training. AEMTs are trained to give medicines intravenously and to perform cardiac monitoring. Paramedics complete the EMT course and receive an additional 1,500 hours in training which takes approximately 18-24 months to complete. Besides the training of the EMTs, paramedics are trained in transcutaneous cardiac pacing, 12 lead ECGs, advanced airway management (including surgical airways), intravenous access to drugs, intraosseous access (putting needles in bones as a fluid and medication route), and a series of treatments to re-inflate collapsed lungs (LifeMed, 2016).

This study looked at EMS providers (volunteer and paid) collectively instead of focusing on each certification level separately.

### **Critical Incidents**

A critical incident is defined as “...any situation faced by emergency service personnel that causes them to experience unusually strong emotional reactions which have the potential to interfere with their ability to function either at the scene or later” (Mitchell, 1983). Donnelly and Bennett (2014) summarize the literature on critical incidents listing the follow as examples of critical incidents: cases that involve injury and death of children; response to acutely ill or seriously injured people; being threatened or assaulted; treating family, friends, or those known to the individual; and having to deal with dead bodies.

The intensity and violence of these incidences are on the rise and the expectations and responsibilities of EMS providers have expanded (Meehan, 2013). December 14, 2012, the day of the Sandy Hook Elementary shooting in Connecticut, ushered in the new era for EMS providers. Before this EMS providers were not expected to accompany law enforcement into an unsecured scene. Usually, EMS providers were part of the aftermath of such incidences. However, on that day, three paramedics and a physician entered the school while the scene was unsecured. They had no idea what awaited them when they entered the school. This was not a one-time event. EMS and firefighters are now entering dangerous scenes along with law enforcement. This model is called a “force protection model,” and EMS providers and firefighters will attempt to rescue victims in potentially dangerous situations while being under the protection of the police (Meehan, 2013).

### **Chronic Stress**

The stress load of EMS providers goes well beyond specific critical incidents. They are not just exposed to one critical incident, but to multiple incidents over a long period of time. EMS providers have to always be on guard because they do not know when they will be asked to go to the scene of a terrible accident or incident (Collopy, Snyder, & Kivlehan, 2012). This chronic stress is a threat to the well-being of EMS providers (Essex & Scott, 2008). EMS providers are similar to armed service veterans who have been deployed in war zones (Collopy, Snyder, & Kivlehan, 2012). According to the West Coast Post-Trauma Retreat, first responders cannot just put their stress down. Every incident is like a large rock that they add to others in a backpack that they cannot take off. After several years, the burden is too great and functionality is

limited (Heglund, 2009). It is this chronic stress that causes many EMS providers to leave the field after 5 years of work (Meehan, 2013).

### **Post-Traumatic Stress Disorder (PTSD)**

High levels of critical incident stress and chronic stress can lead to PTSD (Donnelly, 2012). Studies on EMS providers and PTSD show a range of 15-20% prevalence (Beaton, 2006). In comparison, the prevalence of PTSD in the general population is 7-8% (U.S. Department of Veteran Affairs, 2015), while the prevalence of PTSD in active duty police officers range from 7-19% (Maguen et al., 2009), and the prevalence of PTSD of soldiers who fought in Operations Iraqi Freedom and Enduring Freedom ranges from 11-20% (U.S. Department of Veteran Affairs, 2015).

In the Diagnostic and Statistical Manual (DSM)-IV, PTSD was labeled as an anxiety disorder. However, in the DSM-5 which was released in May 2013, PTSD is under a new chapter entitled “Trauma- and Stress- or Related Disorders.” Another update in the DSM-5, gives more distinction on what makes up a traumatic event, including repeated exposure that could apply to first responders (American Psychiatric Association, 2013). To be diagnosed with PTSD,

the exposure must result from one or more of the following scenarios, in which the individual: directly experiences the traumatic event; witnesses the traumatic event in person; learns that the traumatic event occurred to a close family member or close friend (with the actual or threatened death being either violent or accidental); or experiences first-hand repeated or extreme exposure to aversive details of the traumatic event (not through media, pictures, television or movies unless work-related). (American Psychiatric Association, 2013, para.2).



Also to be diagnosed with PTSD, this disturbance must continue for more than a month and cause substantial distress and impairment to one's social interactions, ability to work, and other major functioning areas of life. This impairment cannot be caused by another medical condition, medication, or substance abuse (American Psychiatric Association, 2013).

The DSM-5 focuses more on behavioral symptoms and enumerates four distinct diagnostic clusters, compared to three distinct diagnostic clusters in the DSM-IV. These four distinct diagnostic clusters are the following: re-experiencing, avoidance, negative cognitions and mood, and arousal. Examples of re-experiencing are flashbacks and recurrent dreams. Avoidance refers to trying to avoid any internal (such as memories, thoughts, or feelings) or external reminders of the event. Examples of negative cognitions and mood are not being able to remember important aspects of the event and blaming oneself for what happened. Characteristics of arousal include self-destructive behavior, inability to sleep, and hypervigilance. One does not have to experience symptoms in all clusters to be diagnosed with PTSD (American Psychiatric Association, 2013).

### **Suicide among EMS Responders**

A survey on critical stress of EMS providers found that 37% of the respondents had contemplated suicide and 6.6 % had actually attempted suicide (Newland et al., 2015). In comparison, the national average of suicide contemplation of adults 18 and over is 3.9%, and the national average of suicide attempts of adults 18 and over is 0.6% (Centers for Disease Control and Prevention, 2015).

Antidotal evidence suggests that the number of EMS suicides is increasing (Erich, 2014). However, the deaths of EMS providers are not collected by any recognized

national agency and death certificates do not consistently include occupational data.

Additionally, death certificates do not mention EMS volunteer service (Wilmoth, 2014).

The police do better at recording the suicide deaths amongst their members. They have the National Surveillance of Police Suicides (NSOPS), a comprehensive study conducted by the Badge of Life Police Mental Health Foundation. According to NSOPS, the police suicide rate dropped from 141 in 2008 to 126 in 2012. NSOPS says that this drop is more than likely because departments across the country are creating an environment that encourages officers to seek professional help and to get preventive annual mental health checkups (Wilmoth, 2014).

### **Risk Factors**

**Poor Coping Skills.** When exposed to stress of any kind, people have to have some type of coping mechanisms to get themselves through the struggle and to be able to function in day to day life. However, not all types of coping are helpful. Holland (2011) lists five detrimental coping mechanisms of those in EMS. These are escape/avoidance, distancing, confrontive coping, accepting responsibility, and self-control.

Escape/avoidance coping uses strategies such as wishful thoughts, and behavioral changes such as day dreaming and watching too much television, to pretend like the event didn't happen. Distancing coping is when one tries to lessen the significance of an event. Confrontive coping is when one uses aggressive tactics and employs hostility and risk taking to change a situation. Accepting responsibility coping is taking blame for what has happened. Self-control coping is when one tries to regulate their emotions and behaviors through will power (Holland, 2011).

Essex and Scott (2008), in a study of volunteer EMS volunteer personnel, found that many destructive coping strategies were used. Nearly all participants (99.3%) scored high in depersonalization, which is similar to the distancing coping in Holland's (2011) research. Some of the other destructive coping skills include drinking alcohol (50.7%), engaging in risky behaviors (37.9%), keeping thoughts to one's-self (88.1%), and avoid thinking about what one is doing (81.2%).

Clohessy and Ehlers (1999) found that wishful thinking and mental disengagement, used by ambulance service workers in response to critical incidents at work, and intrusive memories are correlated with PTSD severity. In their research on veterans of Operations Iraqi Freedom and Enduring Freedom veterans, Pieterzak, Harpaz-Rotem, and Southwick (2011), found that worry and self-avoidance coping strategies were positively related to PTSD symptoms. In a study on occupational stress, personality traits, and coping strategies of South African police officers (Pienar, Rothmann, & De Vijver, 2007), the negative coping skill of avoidance was associated with high suicide ideation.

**EMS Culture.** EMS cultural exacerbates the isolation of the EMS providers who are have issues dealing with critical incidence stress, chronic stress, and PTSD. Many EMS organizations have a rigid, authoritarian, bureaucratic structure that leads to poor leadership manifested in lack of empathy and communication (Beaton, 2006). Dysfunction in the EMS workplace is caused by leaders who refuse to lead, who don't know the difference between management and leadership, and who fail to address minor issues (Ludwig, 2015). EMS culture is also known for its ability to improvise and

overcome difficulties. There is little patience with anyone who interferes with that process (Rubin, 2013).

EMS providers were afraid of losing their job if they reported struggles. EMS providers have been laughed at for asking for help; they have been told that they shouldn't have signed up for the job if they couldn't handle it. Many organizations that the EMS providers worked for didn't offer any type of help to deal with the stresses of the work environment (Newland et al, 2015).

### **Protective Factors**

**Resilience.** The American Psychological Association (2015) defines resilience as “the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress-such as family and relationship problems, serious health problems or workplace and financial stressors. It means ‘bouncing back’ from difficult experiences”(para.4). The risk of developing PTSD can be lowered by acquiring resiliency characteristics (Gunderson, Grill, Callahan, & Marks, 2014).

Ogińska-Bulik and Kobylarczyk (2015) discuss the issue of resiliency as a personality trait. The American Psychological Association (2015), on the other hand, states that resiliency can be learned by anyone as it involves behaviors, thoughts, and actions. According to Gunderson et al. (2014), resiliency can even be learned in a classroom.

The First Responder Resilience program was introduced in January 2013 to foster resilience in personnel who were either directly or indirectly involved in the July 2012 shooting incident at the Aurora Theatre (Gunderson et al., 2014). The program focused on the following 12 resiliency skills: goal setting, nutrition, exercise, sleep, relaxation, ABCs (activating events, beliefs, and consequences), perspectives, self-defeating thoughts,

empathy, wins and losses, reaching out, and social support. The outcome of this program was positive. There was a significant gain in resiliency between the pre-test and the post-test. Also, the six-week follow up showed that those gains in resiliency were retained. Most of the participants found the training to be helpful in dealing with stressful events, and all of the participants recommend that others participate in the training (Gunderson et al., 2014).

**Post-Traumatic Growth.** Traumatic events do not just lead to PTSD; traumatic events can also lead to post-traumatic growth (PTG). PTG is defined by Tedeschi and Calhoun (2004) as “the experience of positive change that occurs as a result of the struggle with highly challenging life crises” (p.1). PTG can occur in five unique areas: greater appreciation of life, closer social relationships, increased personal strength, enhanced spirituality, and sense of new possibilities (Tedeschi & Calhoun, 1996). People who have experienced growth after trauma are more likely to have certain traits, some of which are the following: humor, kindness, leadership, creativity, curiosity, bravery, honesty, forgiveness, fairness, gratitude, and hope (Peterson, Park, Pole, D’Andrea, & Seligman, 2008).

PTG is protective against future stressors, increases hope, and improves interpersonal relationships (Tedeschi & Calhoun, 1995). However, PTG does not mean that there is no psychological distress. In fact, for PTG to occur one must experience a sense of trauma or distress to which they are forced to adapt. PTG doesn’t bring a person back to his/her previous state before the incident or string of incidents. PTG elevates the person’s state above the baseline. This is where PTG differs from resilience. Resilience is

the ability to go on with life after hardship, while PTG involves being shaped by that hardship and improving upon pre-trauma levels of adaptability (Tedeschi & Calhoun, 2004).

A study conducted by Gallaway, Milikan, and Bell (2011) on soldiers who were recently deployed to Iraq and who were exhibiting negative health behaviors and conditions (e.g., adjustment disorder, posttraumatic stress disorder, alcohol use, depression, and suicidal ideation), found a significant inverse relationship between PTG and suicide ideation. Soldiers who reported recent suicidal ideation scored significantly lower in overall PTG.

**Positive Coping Skills.** The extent to which PTG is developed depends highly on how one copes during trauma or adversity (Tedeschi, 1999). PTG is linked more to coping skills than even social support and personality variables. The most effective coping skills in the development of PTG are positive reappraisal, acceptance coping, and religious coping (Prati & Pietrantonio, 2009). The coping skill of planning (thinking ahead of how to actively handle a situation) increases the level of PTG, especially in the domain of appreciation of life (Ogińska-Bulik & Kobylarczyk, 2015). In a study on occupational stress, personality traits, and coping strategies of South African police officers (Pienar, Rothmann, & De Vijver, 2007), the positive coping skills of conscientiousness, emotional stability, approach coping, and turning to religion were associated with low suicide ideation.

## **Workplace Interventions**

### **Critical Incident Stress Debriefing (CISD)/Critical Incident Stress**

**Management (CISM).** As mentioned previously, EMS providers are exposed to critical incidents on a regular basis (Donnelly and Bennett, 2014). It has been shown that those who respond to critical incidents are vulnerable to normal physical and psychological responses to trauma (Mitchell, 1983). To reduce the number of psychological casualties among emergency service personnel, an intervention needed to be found to alleviate their acute stress responses and inhibit delayed stress reactions (Mitchell, 1983). Therefore, Mitchell (1983) developed Critical Stress Debriefing (CISD) to address this issue.

CISD is sometimes called psychological debriefing and is likened to group psychotherapy (Everly & Mitchell, 2000). However, Mitchell, stresses that CISD does not take the place of psychotherapy and it was not meant to be the sole component of a crisis intervention framework (Mitchell & Everly, 1997). CISD is actually just one component of CISM (Everly & Mitchell, 1999).

The scope of CISD has been expanded to include such settings such as schools, businesses, industrial, airlines, and mass disasters (Everly & Mitchell, 2000). The CISD team usually is made up of a mental health professional who has at least a master's degree and peers who have had CISD training (Mitchell & Bray, 1990). The most current model of CISD has seven separate phases and takes anywhere from an hour and a half to three hours to complete. CISD usually takes place anywhere from two to 14 days after a critical incident, but if the critical incident is a mass disaster, it is recommend that three or four weeks pass before CISD is conducted. CISD can also be used as a mechanism to identify those who need greater psychological care (Everly & Mitchell, 2000).

CISM has many components; CISD is one of those components. The main components of CISM include the following: pre-incident planning, policy development, education, and training; crisis assessment; strategic planning; individual crisis intervention; large group interventions (Demobilization, Crisis Management Briefing); Small group interventions (Defusing, CISD); Pastoral crisis intervention; family support services; significant other support services; follow-up services; referral services; follow-up meetings; post-incident education; and links to pre-incident planning and preparation for the next crisis (Everly & Mitchell, 1999).

There is some debate if CISD/CISM works and is effective in reducing PTSD symptomology. In an extensive review of the literature, Bledsoe (2003) found several studies that showed CISM to be ineffective in preventing PTSD and several studies that showed worsening of stress-related symptoms in those who received CISM. Newland and colleagues (2015), however, found that of the 18% of EMS providers who attended a CISM-type program, 63% found the sessions very helpful or extremely helpful.

**Employee Assistance Program (EAP).** Many employers offer some type of Employee Assistance Program (EAP). The type of EAP a workplace offers depends on the structure and needs of the organization. In general, EAPs help address productivity issues and employee concerns such as emotional, financial, and legal (NetCE, 2013)

EAP services include assessment, referral, and short-term counseling. During the first session, the EAP counselor conducts a comprehensive psychological assessment. EAP counselors do not provide treatment or therapy. If the EAP counselors thinks that the issue needs further attention, they will refer the employee to treatment. The main role



of an EAP counselor is to conduct an assessment and connect employees to appropriate resources. Short term counseling might be helpful for those who have stress (that doesn't require treatment or therapy), communication issues, time-management issues, life-balance issues, or issues regarding adjustment to a new position (NetCE, 2013).

It is not uncommon for EMS providers to be disillusioned by EAP programs (Newland et al, 2015). Some EMS providers feel like the EAP counselors know very little about the stresses of the EMS industry and the EAP counselors are often shocked or horrified of the critical incidences that EMS providers encounter on a regular basis (Newland et al, 2015). In the study by Newland et al. (2015), of the 11% who attended EAP sessions, 53% reported that the EAP sessions were very or extremely helpful.

## CHAPTER 3

### METHODOLOGY

This cross-sectional study approved by the WKU Institutional Review Board, employed an online survey, launched through Qualtrics from the middle of January 2016 to the end of March 2016.

#### **Participants**

EMS providers, ages 18 or older, were recruited from various EMS-related groups on Facebook and provided a link to the online survey. State EMS coordinators were also contacted and asked to distribute the survey link to their mailing lists. After six weeks, data were downloaded, yielding 2683 valid responses from all fifty states and nineteen countries besides the United States.

#### **Measures**

**Demographics.** Age was measured continuously and recoded for descriptive purposes. Gender, race/ethnicity, and marital status was measured using common response options. Military combat experience was measured dichotomously.

**EMS Work Experience.** Years of EMS experience and years at current workplace were measured continuously, and then recoded for descriptive purposes. Also measured were the level of EMS certification (EMR, EMT, AEMT, Paramedic, or other), current workplace type (private service, fiscal court based, hospital based, fire service, air service, critical ground care, or other), service area (rural, suburban, or urban), unionization (yes/no), and busyness of service (not at all busy, occasionally busy,

moderately busy, frequently busy, or busy all of the time).

**EMS Culture.** A ten item EMS Culture Scale was developed based on a review of the literature and expert opinion. Participants were asked to state their level of agreement on each item using a five-point Likert scale (Strongly Disagree to Strongly Agree). A scale score was computed by averaging responses. The higher the score, the more positive the environment. Cronbach's alpha for the scale was .894.

**Post-Incident Services.** Participants were asked to state whether each of the four post-incident services (one-time debriefing, multiple debriefings, employee assistance program, and professional counseling) were required by their current employer, encouraged, available on request, or not available. Respondents could also state if they did not know.

**Suicide Ideation.** Participants were asked to state how frequently they had thoughts of suicide in the past six months using a five-point scale (Never – Daily). Participants who did not answer “never” were asked to specify the actual number of days during the last 30 days that they had thoughts of suicide; those who answered “never” on the six-month suicide ideation question were coded as zero on the 30-day suicide question, which was recoded for descriptive purposes.

**PTSD Symptomology.** Under the DSM-IV there were three separate PTSD checklists: PCL-C (for civilians), PCL-M (for military), and PCL-S (for a specific incidence). Under the new DSM-5, there is only one PTSD checklists called PCL-5. This is one is most similar to PCL-S (U.S. Department of Veteran Affairs, 2016). EMS stress is chronic and is similar to the stress that veterans experience. A previous study (Donnelly & Bennett, 2014) that measured PTSD symptomology in the EMS population

used a modified PCL-M because it focuses on continuous traumatic exposure, not just one traumatic event. In the modification, respondents were asked questions about stressful work experiences instead of stressful military experiences. Our study also used a modified PCL-M.

The survey consists of a 17-item scale that allows a continuous measure of PTSD symptomology. Responses are in a five point Likert scale (Not at All to Extremely). Points from each response are totaled to get the final score. The military cutoff for PTSD diagnosis is 50. The Donnelly and Bennett study (2014) uses the military cutoff instead of the civilian cutoff because the work place stress of EMS providers is similar to experiences of military personal. However, the Donnelly and Bennet study (2014) focuses on the continuous measure of PTSD symptomology because any amount of posttraumatic stress can cause impairment (Zlotnick, Franklin, & Zimmerman, 2002). Our study used the military cutoff of 50 for PTSD diagnosis for descriptive purposes, but used the scale continuously for inferential analyses.

**Resilience.** Resilience was measured using the Brief Resilience Scale (Smith, Dalen, Wiggins, Tooley, Christopher, & Bernard, 2008), which is one of the three resilience instruments that received the best ratings in a study that performed a quality assessment of the scale psychometric properties of 19 different resilience scales (Windle, Bennett, & Noyes, 2011). It consists of six questions with responses that are on a 5 point Likert Scale ranging from Strongly Disagree to Strongly Agree. The scores for each question are added; then the sum is divided by the total number of questions.

**Post Traumatic Growth (PTG).** The Post-Traumatic Growth Inventory (PTGI) is the most used method to assess post-traumatic growth (Jayawickreme & Blackie, 2014). The PTGI consists of 21 questions within five domains: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life (Tedeschi & Calhoun, 1996). The responses for each question is on a detailed six point Likert scale ranging from 0 to 5. The overall PTG score is calculated by adding the responses from all 21 questions.

**Coping.** The Brief COPE, published in 1997 as an alternative to the 1989 long version, consists of 28 questions which includes the following 14 subscales: self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental Support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame (Carver, Scheier, Weintraub, 1989; Carver, 1997). Each question is answered on a four point Likert scale that ranges from “I haven’t been doing this at all” to “I’ve been doing this a lot.” There is no overall score on this measure. Each sub-scale is summed and looked at separately to see what its relations is to other variables

## **ANALYSIS OF DATA**

Frequencies and measures of central tendencies were used for descriptive analysis. To test hypotheses, bi-variate correlations and one-way analysis of variance (ANOVA) were used. If the ANOVA showed a significant difference, a Tukey’s HSD test was performed to see were those differences were. A 95% level of confidence was used for all inferential analyses. Data were analyzed using SPSS Version 23.

## CHAPTER 4

### Results

#### **Descriptive Statistics**

There were 2,683 valid responses to our IRB approved online survey. As shown on Table 1, a majority of our respondents were white (92.8%), married (55%) males (64.8%) under 35 years old (47.1%). Nearly a quarter (24.7%) had at least a Bachelor's Degree, and only 4.8% had military combat experience.

Table 1

*Demographic Characteristics of Respondents*

<u>Variable</u>	<u>M</u>	<u>SD</u>	<u>f</u>	<u>%</u>
Gender				
Male			1735	64.8
Female			941	35.2
Age	37.3	12.53		
<25			389	14.5
25-34			873	32.6
35-44			729	27.2
45-54			465	17.3
55-64			175	6.5
65+			50	1.9
Marital status				
Single, never married			810	30.3
Married/living as married			1473	55.0
Separated/divorced			374	14.0
Widowed			20	.7
Ethnicity				
American Indian/Native Alaskan			38	1.4
Asian			12	.4
Black or African American			23	.9
Hispanic/Latino			53	2.0
Native Hawaiian/Pacific Islander			6	.2
White or Caucasian			2486	92.8
Multi-racial			60	2.2
Education				
GED/ H.S. Diploma			187	7.0
Some College			1141	42.6
Associates Degree			632	23.6
Bachelor's Degree			508	18.9
Master's Degree			120	4.5
Doctoral Degree			15	.6
Professional Degree			20	.7
Other			58	2.2
Military Combat Experience				
Yes			128	4.8
No			2549	95.2

As shown on Table 2, over half of the respondents were paramedics (59%). The average years of EMS experience was 13.3 (SD=9.3). Approximately thirty percent of respondents were currently employed by either a private EMS service (30.9%) or fire service (29.0%). The average years in the current EMS job was 9 (SD=8.25).



Table 2

*EMS Characteristics*

Variable	<u>M</u>	SD	f	%
EMS Level				
EMR				1.3
EMT			862	32.9
AEMT			177	6.8
Paramedic			1546	59.0
Other Certifications?				
Yes			1240	46.6
Years of EMS Experience	13.3	9.3		
<5			473	18.1
5- 9			635	24.3
10-14			454	17.4
15- 19			374	14.3
20-24			305	11.7
25+			370	14.2
Current Employer				
Private service			822	30.9
Fiscal court based			88	3.3
Hospital based			311	11.7
Fire service			771	29.0
Air service			43	1.6
Critical ground care			103	3.9
Other			523	19.7
Years at Current Employer	9.0	8.25		
<5			1045	39.5
5- 9			609	23.0
10-14			368	13.9
15- 19			275	10.4
20-24			159	6.0
>25			188	7.1
Position type				
Paid			2315	87.2
Volunteer			340	12.8
Service area				
Urban			1087	40.8
Suburban			548	20.6
Rural			1028	38.6
Service volume				
Not at all busy			47	1.8
Occasionally busy			323	12.2
Moderately busy			721	27.3
Frequently busy			765	28.9
Busy all of the time			787	29.8
Unionized Service				
Yes			851	31.9
No			1818	68.1

This study also looked at the following post-incident services (PIS): one-time debriefing, multiple debriefings, employee assistance program (EAP), and professional counselling. As shown in Table 3, few EMS workplaces mandated or encouraged PIS. Each PIS except for one-time debriefing was mandated by less than 1.5% of the EMS workplaces. One-time debriefing was mandated by 6.9% of the EMS workplaces. Each of the PIS were encouraged less than 25% by the EMS workplaces. Professional counselling was the least encouraged post-incident service (11.2%).

Table 3

*Post- Incident Services*

Type of Service	Mandatory/ Required	Encouraged, But not required	Available Upon Request	Not Available	Not Sure/ Don't Know
One-Time Debriefing	6.9% (n=163)	23.9% (n=563)	43.0% (n=1012)	14.3% (n=336)	11.9% (n=281)
Multiple Debriefings	1.1% (n=27)	11.4% (n=267)	39.5% (n=927)	26.6% (n=625)	21.4% (n=502)
EAP	1.4% (n=34)	17.4% (408)	45.3% (n=1065)	17.4% (n=408)	18.5% (n=436)
Professional Counselling	.3% (n=8)	11.2% (n=264)	45.5% (n=1069)	23.0% (n=540)	20.0% (n=469)

As shown on Table 4, more than one quarter of the respondents (27.7%) met the criteria for PTSD. Close to half of the respondents (42.0%) reported having contemplated suicide in the last six months. Of those who had contemplated suicide in the last 30 days, over one quarter (27.1%) did so on 10 or more days in the last 30 days. Close to half (43.8%) of the respondents had lost a colleague to suicide.

Table 4

*PTSD and Frequency of Suicide Ideation and Loss*

Variable	M	SD	f	%
PTSD Score	39.07	17.41		
50+			515	27.7
40-49			321	17.3
<40			1022	55.0
Frequency of suicide thoughts in the last 6 months				
Never			1124	58.00
Rarely			386	19.90
Sometimes			269	13.90
Often			117	6.00
Daily			43	2.20
Thoughts of suicide in last 30 days				
1 – 5 days			362	69.3
6-9 days			19	3.6
10+			141	27.1
Lost colleague due to suicide				
Yes			844	43.80
No			1085	56.20

**Inferential Results**

**H0: Personal Factors and PTSD.** This study tested the hypothesis that there would be no association between personal factors and PTSD symptomology. To test this null, a bi-variate correlation was run between personal factors (resilience, PTG, and COPE subscales) and PTSD scores.

As shown on Table 5, there were several statistically significant moderate relationships between PTSD scores and personal factors. Only one, resilience, was negatively associated with PTSD score:  $r(1838) = -.52, p < .01$ . Conversely, several of the COPE subscales were positively associated with PTSD scores: behavioral disengagement,  $r(1840) = .62, p < .01$ ; denial,  $r(1844) = .54, p < .01$ ; self-blame,  $r(1832) = .61, p < .01$ ; self-distraction,  $r(1843) = .44, p < .01$ ; and substance use,  $r(1841) = .45, p < .01$ .

There were statistically significant relationships between PTSD scores and six of the other COPE subscales: venting,  $r(1838) = .33, p < .01$ ; acceptance,  $r(1838) = .10, p < .01$ ; humor,  $r(1829) = .29, p < .01$ ; planning,  $r(1837) = .24, p < .01$ ; religion,  $r(1831) = -.05, p < .05$ ; and use of emotional support,  $r(1836) = -.07, p < .01$ . However, they had a weak magnitude of effect, and, therefore, are not meaningful findings. The remaining COPE subscales (positive reframing, active coping, and use of instrumental support) were not statistically associated with PTSD scores, nor was PTG.

Because there were some significant associations with moderate magnitudes, we reject null hypothesis one.

Table 5

*Correlation between Personal Factors and PTSD Scores*

	PTSD Score
Resilience	-.52**
Post Traumatic Growth	.00
Coping Sub-Scales	
Behavioral Disengagement	.62**
Denial	.54**
Self-Blame	.61**
Self-Distraction	.44**
Substance Use	.45**
Venting	.33**
Acceptance	.10**
Active Coping	-.00
Humor	.287**
Planning	.235**
Positive Reframing	.031
Religion	-.046*
Use of Emotional Support	-.070**
Use of Instrumental Support	.020

Note: Ns range from 1786-1844, \* $P < 0.05$ , \*\* $p < 0.01$

**H0<sub>2</sub>: Personal Factors and Frequency of Suicide Ideation.** This study tested the hypothesis that there would be no association between personal factors and frequency

of suicide ideation in the last 30 days. To test this null, a bi-variate correlation was run between personal factors (resilience, PTG, and COPE subscales) and frequency of suicide ideation.

As shown on Table 6, there were statistically significant but weak negative relationships between frequency of suicide ideation and resilience,  $r(1910) = -.22, p < .01$  and PTG,  $r(1857) = -.10, p < .01$ .

There were also several weak positive relationships between frequency of suicide ideation and the following COPE subscales: behavioral disengagement,  $r(1915) = .33, p < .01$ ; denial,  $r(1922) = .21, p < .01$ ; self-blame,  $r(1905) = .29, p < .01$ ; self-distraction,  $r(1918) = .16, p < .01$ ; substance use,  $r(1915) = .23, p < .01$ ; venting,  $r(1913) = .16, p < .01$ ; humor,  $r(1899) = .11, p < .01$ ; planning,  $r(1991) = .11, p < .01$ ; and religion,  $r(1904) = .07, p < .01$ .

There were no significant relationships between frequency of suicide ideation and the following COPE subscales: acceptance, active coping, use of instrumental support, and use of emotional support.

While there were some statistically significant associations, we fail to reject null hypothesis two because of the weak magnitude of effect.

Table 6

*Correlation between Personal Factors and Suicide Ideation*

	Suicide Ideation
Resilience	-.22**
Post Traumatic Growth	-.10**
COPE Sub-Scales	
Behavioral Disengagement	.33**
Denial	.21**
Self-Blame	.29**
Self-Distraction	.16**
Substance Use	.23**
Venting	.16**
Acceptance	.04
Active Coping	-.02
Humor	.11**
Planning	.11**
Positive Reframing	-.04
Religion	.07**
Use of Emotional Support	.001
Use of Instrumental Support	-.03

\*\*p<0.01

**H0<sub>3</sub>: EMS Culture and PTSD.** This study tested the hypothesis that there would be no association between EMS culture and PTSD symptomology. To test this null, a bi-variate correlation was run between EMS culture and PTSD score.

As shown on Table 7, there was a moderate negative correlation between EMS Culture and PTSD score,  $r(1815) = -.51, p=.00$ . Thus, we reject null hypothesis three.

**H0<sub>4</sub>: EMS Culture and Frequency of Suicide Ideation.** This study tested the hypothesis that there would be no association between EMS culture and frequency of suicide ideation. To test this null, a bi-variate correlation was run between EMS culture and frequency of suicide ideation.

As shown on Table 7, there was only a weak significant negative relationship between EMS culture and frequency of suicide ideation,  $r(1898) = -.24, p=.00$ . We fail to reject null hypothesis four because of the weak magnitude of effect.

Table 7

*Correlation between EMS Culture and PTSD Scores and Frequency of Suicide Ideation*

	PTSD Score	Frequency of Suicide Ideation
EMS Culture	-.51**	-.24**

\*\* $p < 0.01$

**H0<sub>5</sub>: PIS and PTSD.** This study tested the hypothesis that there would be no difference between PIS and PTSD symptomology. A series of One-Way ANOVAs were run to determine if there were differences in PTSD scores by whether each type of post incident services was mandatory, encouraged, available upon request, not available, or if the EMS worker was not sure if the PIS was available. A Tukey's HSD Post Hoc test was performed to see where significant differences were found.

As shown in Table 8, mean PTSD scores were significantly lower for each type of PIS when the service was encouraged and were significantly higher when not available. Mean PTSD scores were significantly lower among services mandating one-time debriefing,  $F(4, 1849) = 27.42, p < .01$ , though no different than those encouraging its use. Otherwise, mandating PIS was only significantly different from PIS not being available for multiple debriefings,  $F(4, 1842) = 36.57, p < .01$ , and EAP,  $F(4, 1844), p < .01$ . Mean PTSD scores were lowest for multiple debriefings.

Because there were significant differences, we reject null hypothesis five.

Table 8

*Post Hoc Analysis of Differences between Post-Incidence Services and PTSD Scores*

Variable	M	SD	F
PTSD Scores			
One-Time Debriefing			27.42** M,E<A, NS<NA
Mandatory/Required	33.28	16.28	
Encouraged, but not required	34.26	16.12	
Available Upon Request	39.74	16.70	
Not Available	46.80	18.15	
Not Sure/Don't Know	40.66	18.24	
Multiple Debriefings			36.57** M<NA; E<A<NA, NS
Mandatory/Required	31.78	16.50	
Encouraged, but not avail.	31.78	15.58	
Available Upon Request	36.14	16.15	
Not Available	45.77	17.79	
Not Sure/Don't Know	39.91	17.16	
EAP			16.77** M<NA; E<A<NA, NS
Mandatory/Required	34.04	17.74	
Encouraged, but not required	33.90	15.60	
Available Upon Request	39.50	17.42	
Not Available	44.75	17.76	
Not Sure/Don't Know	38.12	17.23	
Professional Counseling			40.53** E<A<NA, NS
Mandatory/Required	32.83	10.61	
Encouraged, but not required	32.00	15.74	
Available Upon Request	36.52	16.21	
Not Available	47.34	17.65	
Not Sure/Don't Know	39.36	17.46	

\*\* p &lt;.01

M=mandatory/required; E=encouraged, but not required; A=available upon request; NA=not available; NS=not sure/don't know

**H0: PIS and Frequency of Suicide Ideation.** This study tested the hypothesis that there would be no difference between PIS and frequency of suicide ideation in the last 30 days. A series of One-Way ANOVAs were run to determine if there were differences in frequency of suicide ideation in the last 30 days by whether each type of post incident services was mandatory, encouraged, available upon request, not available, or if the EMS worker was not sure if the PIS was available. A Tukey's HSD Post Hoc test was performed to see where significant differences were found.



As shown in Table 9, frequency of suicide ideation in the last 30 days differed significantly for each type of PIS. For services where each PIS was not available, the mean frequency of suicide ideation in the last 30 days was significantly higher. Conversely, services that encouraged the use of PIS had lower mean frequencies of suicide ideation.

Because there were significant differences, we reject the null hypothesis six.

Table 9

*Post Hoc Analysis of Differences between Post-Incidence Services and Suicide Ideation*

Variable	M	SD	F
<b>Suicide Ideation</b>			
One-Time Debriefing			12.03** M,E, A, NS< NA
Mandatory/Required	.94	3.99	
Encouraged, but not required	1.11	3.83	
Available Upon Request	1.82	5.14	
Not Available	3.71	7.69	
Not Sure/Don't Know	1.83	5.24	
Multiple Debriefings			11.45**E,A, NS<NA
Mandatory/Required	.89	3.43	
Encouraged, but not required	.96	3.86	
Available Upon Request	1.27	4.12	
Not Available	3.10	6.93	
Not Sure/Don't Know	1.83	5.32	
EAP			8.54**E<A<NA; NS<NA
Mandatory/Required	1.35	4.81	
Encouraged, but not required	.82	2.90	
Available Upon Request	1.84	5.15	
Not Available	3.17	5.14	
Not Sure/Don't Know	1.69	5.36	
Professional Counseling			11.43**; E, A, NS<NA
Mandatory/Required	2.43	5.59	
Encouraged, but not required	.72	2.94	
Available Upon Request	1.42	4.57	
Not Available	3.2	6.94	
Not Sure/Don't Know	1.88	5.45	

\*\*p<.01

M=mandatory/required; E=encouraged, but not required; A=available upon request; NA=not available; NS=not sure/don't know

### **Other Factors that may influence PTSD scores and Frequency of Suicide Ideation**

This study also measured other factors besides personal factors (resilience, PTG, and coping skills) and work factors (EMS culture and PIS) that may influence PTSD scores and frequency of suicide ideation in the last 30 days such as the following: years of EMS experience, service area (urban, rural, or suburban), gender, position type (volunteer or paid), race, and region of country.

A One-Way ANOVA was run between years of EMS experience and PTSD score ( $F(5,1807) = 3.68, p = .003$ ). Since there was a significant difference, a Tukey's HSD Post Hoc test was performed to see where the significance differences were. The only significant differences were that the PTSD scores of EMS providers who worked more than 25 years were significantly lower than those who had worked under five years, those who had worked 10-14.9 years, and those who had worked 15-19.9. A One-Way ANOVA was also run between years of EMS experience and frequency of suicide ideation in the last 30 days. Results were not significant at the 95% confidence level.

A one-way ANOVA was run between service area (urban, rural, or suburban) and PTSD score and with frequency of suicide ideation in the last 30 days. Results were not significant at the 95% confidence level for either PTSD score or frequency of suicide ideation in the last 30 days.

An independent t-test was run between gender and PTSD score and between gender and frequency of suicide ideation in the last 30 days. There was a significant difference between gender and PTSD score ( $t(1850) = -3.425, p = .001$ ). Females had

higher PTSD scores than males. There was no significant difference between gender and frequency of suicide ideation in the last 30 days at the 95% confidence level.

An independent t-test was run between position type (volunteer or paid) and PTSD score and between position type and frequency of suicide ideation in the last 30 days. There was a significant difference between position type and PTSD score ( $t(1841) = 4.31, p = .00$ ). Paid EMS providers had higher PTSD scores than volunteer EMS providers. There was no significance between position type and frequency of suicide ideation in the last 30 days.

The question that measured race in our study gave the following choices: American Indian or Native Alaskan, Asian, Black or African American, Hispanic/Latino, Native Hawaiian or other Pacific Islander, White or Caucasian, and multi-racial. All choices that were not white were recoded as non-white. An independent t-test was then run between race (white vs non-white) and PTSD score and between race and frequency of suicide ideation in the last 30 days. There was no significant difference between race and PTSD score and between race and frequency of suicide ideation in the last 30 days at the 95% confidence level.

The question that measured the work location of EMS providers gave the following choices: do not work in the U.S. and the choice of all fifty states and Washington D.C. The states and Washington D.C. were re-coded by the four regions set up by the U.S. Census Bureau. These regions include the following: Northeast (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania); Midwest (Illinois, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South

Dakota); South (Delaware, D.C., Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, and Texas); and West (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming, Alaska, California, Hawaii, Oregon and Washington).

A One-Way ANOVA was run between regions of the United States where EMS providers work and PTSD score and between regions of the United States where EMS providers work and frequency of suicide ideation in the last 30 days. There were no significant differences between regions of the United States where EMS providers work and PTSD score at the 95% confidence level. There was a significant difference between where EMS providers work and frequency of suicide ideation ( $F(3, 1841) = 5.16, p = .001$ ). A Tukey's HSD was performed to see where the significant differences were. The West had a significantly lower mean of frequency of suicide ideation than the Northeast and the Midwest.

## CHAPTER 5

### **Discussion and Conclusion**

EMS providers encounter traumatic events on a regular basis. They are often called to gruesome scenes, and in some instances their lives may even be in danger. This exposure to critical stress and cumulative chronic stress puts them at risk for PTSD and suicide ideation. The purpose of this study was to characterize PTSD and suicide ideation risk among EMS providers and identify potential protective or risk relationship in various personal and work factors.

#### **Prevalence of PTSD**

More than one out of four of our respondents met the PTSD criteria of 50 or higher on the M-PCL, and another 17.3% scored between 40 and 49. This prevalence is more than three times greater than the national average. Other studies of EMS providers and PTSD show a range of 15-20% prevalence (Beaton, 2006). EMS providers with PTSD may not be able to do their jobs as efficiently and safely as those providers without PTSD. The public depends on EMS providers to be at their very best because often their quick thinking can truly make the difference between people living or dying.

#### **Protective and Risk Factors for PTSD**

In this study, PTSD scores and resilience were negatively correlated, thus suggesting resiliency has a protective effect on PTSD. Gunderson, Grill, Callahan, and Marks (2014) stated that PTSD can be lowered by acquiring resiliency characteristics. Resilience is protective because it helps one become flexible and proactive in taking

remedial action in difficult situations, thus allowing for a greater tolerance of negative emotions and feelings and more effective ways to cope with stress and negative emotions (Oginska-Bulik and Kobylarczyk, 2015). It may be helpful for EMS workplaces to provide training in resilience.

Post Traumatic Growth (PTG) may be seen as a possible protective factor against PTSD as those who develop PTSD use adaptive coping skills while maladaptive coping skills are used by those who develop PTSD (Moran, Burker, & Schmidt, 2013). However, no significant positive or negative relationship between PTG and PTSD were found nor any connection between positive coping strategies and PTSD scores.

However, several of the negative COPE subscales (behavioral disengagement, denial, self-blame, self-distraction and substance use) had moderately strong positive correlations with PTSD scores. Each of these represent a possible intersection for intervention. For example, an intervention targeting substance use among EMS providers may have an impact on PTSD symptomology. However, more research needs to be done. The findings that negative coping skills have a relationship with PTSD symptomology were in line with previous studies (Pieterzak, Harpaz-Rotem, & Southwick, 2011; Clohessy & Ehlers, 1999).

In this study, positive EMS culture was negatively associated with PTSD, thus suggesting that it has a protective effect. Our study also found that encouraging PIS has a statistically significant impact on PTSD scores. PTSD score means were lower when each PIS was encouraged. Encouraging-but not mandating-PIS use could be perceived to

be a function of supportive work environment. PTSD score means were lowest for multiple debriefings.

It was also found that years of EMS experience, gender, and type of service (paid or volunteer) had an influence on PTSD scores.

### **Prevalence of Suicide Ideation**

Close to half of the respondents reported having contemplated suicide in the last six months. Of those who had contemplated suicide in the last 30 days, nearly one in three thought about suicide 10 or more days in the last 30 days. In comparison, the EMS Critical Stress Study (Newland et al., 2015) reported that 37% of EMS providers contemplated suicide at some point in their lives. Furthermore, close to half of the respondents of our study had lost a colleague to suicide. EMS providers who are contemplating suicide may not be able to focus on all of the details of their job that make a difference between life and death and may not have a vested interest in the results of their work.

### **Protective and Risk Factors for Suicide Ideation**

No moderate or strong associations were found between personal factors (resilience, PTG, and coping strategies) and EMS culture and frequency of suicide ideation. Other studies have shown a relationship between personal factors, EMS culture, and suicide ideation. One study showed a relationship between PTG and suicide ideation (Gallaway, Milikan, and Bell, 2011). However, this was a study between PTG and deployed soldiers in Iraq. Participants were chosen on their current exhibition of negative health behaviors or conditions. One study showed a relationship between positive coping

and suicide ideation (Pienar, Rothmann, and De Vijver (2007). However, this was a study on occupational stress, personality traits, coping strategies, and suicide ideation of South African police officers. The EMS critical stress study (Newland et al., 2015) reported that EMS providers who worked in more positive cultures had less suicide ideation. However, the EMS critical stress study focused on lifetime suicide ideation while our study focused on suicide ideation in the last thirty days. Also each of the above studies used different instruments to measure suicide ideation.

Based on the relationships between personal factors, work factors, and PTSD, we had expected to find some relationships between personal factors, work factors, and suicide ideation. Our study focused on frequency of suicide ideation in the last 30 days. However, we wanted to investigate the relationships between personal factors, work factors, and suicide ideation further.

We went back to the first question on suicide ideation on our survey. Which was “How often in the last six months have you contemplated suicide?” Response choices were never, rarely, sometimes, often, and daily. We recoded “never” as “No” to suicide ideation and the other responses were recoded as “Yes” to suicide ideation. We then ran an independent t-test on suicide ideation in the last 6 months and EMS culture, resilience, PTG, and COPE subscales. We found several differences between those who had no suicide ideation in the past six months and those that did. For those that had contemplated suicide in the past 6 months, EMS culture ( $t(1892) = 14.91, p = .00$ ); resilience ( $t(1908) = 15.31, p = .00$ ); and PTG scores ( $t(1855) = 2.70, p = .007$ ) were lower. The following negative COPE subscales were higher: self-distraction ( $t(1915) = -12.50, p = .00$ ); denial



( $t(1919) = -14.15, p = .00$ ); substance use ( $t(1912) = -16.08, p = .00$ ); behavioral disengagement ( $t(1912) = -20.66, p = .00$ ); and self-blame ( $t(1902) = -.21.05, p = .00$ ).

Our study found that when EMS workplaces did not provide PIS, there was a statistically significant higher mean of suicide ideation in the last thirty days. Mitchell (1983) recognized that emergency service personnel had the possibility of becoming psychological impaired due to the critical incidents they encountered and that intervention was needed to alleviate acute stress responses and inhibit delayed stress reactions. Not providing PIS can be detrimental to the EMS workforce.

Our study also found that the region in the United States where EMS providers work had an influence on frequency of suicide ideation in the last 30 days.

### **Limitations**

This study is a cross-sectional study, thus no causation can be attributed. The sample, while large, was one of convenience; therefore findings may not be reflective of all EMS providers. As with any self-reported data, responses are limited by recall, recency, and social desirability.

### **Public Health Recommendations**

The field of EMS is relatively new and does not yet have an adequate infrastructure for surveilling and responding to mental health issues such as PTSD and suicide ideation (National EMS Management Association, 2016). Adoption of a new mindset that integrates research into EMS system operations should be encouraged (National Highway Traffic Safety Administration, 2001). The field of EMS would benefit from research on the prevalence of PTSD and suicide among EMS providers, and a

national database that monitors suicides of EMS providers and prevalence of PTSD would provide reliable data on how widespread or endemic this issue is.

EMS workplaces should provide PIS, especially multiple debriefings since they had the lowest mean PTSD score. Also, these services should be encouraged rather than mandated. EMS providers could also benefit from resilience training provided by their workplace.

### **Research Recommendations**

Further research should be done on to what extent years of EMS work experience, gender, race, position type (volunteer or paid), and work region influences PTSD scores and suicide ideation. Research should also be done on to what extent of influence the following have on PTSD scores and suicide ideation; level of emotional support of EMS partners (within the workforce and in personal life), drug/substance use, work hours/load, eating habits, and exercise habits.

The literature shows that resilience training for EMS providers after a trauma such as a mass shooting is effective in fostering resilience. However, from a public health standpoint, it would be beneficial to study if resilience training as a preventive measure before traumatic exposure has an effect on resilience after traumatic exposure.

This study measured frequency of suicide ideation but did not measure suicide attempts. Most people who have suicide thoughts never make an attempt (Suicide.org, n.d.). There needs to be research on the risk and protective factors of suicide attempts among EMS provider that include other factors besides work related factors such as the following: mental illness (diagnosed or undiagnosed), loss of a loved one, broken

relationships, lifetime abuse history (verbal, sexual, physical, etc.), and financial situation.

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