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Suicide Mortality of Emergency Department Patients

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SUICIDE MORTALITY OF EMERGENCY DEPARTMENT PATIENTS

by

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Abstract

Purpose The purpose of this retrospective comparative study is to describe relationships among biological, psychological, sociocultural factors and emergency department (ED) care among discharged ED patients and describe the association of these variables with subsequent suicide mortality.

Rationale Identifying patients who are most at risk of suicide mortality post ED discharge can focus resources, refine interventions, and prevent suicide. Additionally, recognizing patterns of ED care including ordering of a psychiatric evaluation and disposition status can provide data for potential practice changes.

Background Suicide is the 10th leading cause of death in the United States and has been since 2008. Suicide is preventable if those at risk are identified and provided with timely interventions. Many victims of suicide have interactions with healthcare providers in the year prior to suicide making the ED a critical setting for the detection of suicidal ideation and suicide prevention.

Method This retrospective comparative study matched data from patient cases treated in one of four EDs of an integrated healthcare system from March 1, 2015 to March 31, 2019 with San Diego County Medical Examiner's suicide data from March 1, 2015 to March 31, 2020.

Findings The incidence of suicide was 33 per 100,000 and 67.8% of suicide mortality occurred within 1 year of ED discharge. In this study, the majority of cases were White, non-Hispanic/non-Latino, English speaking males in their late 40s with 3 or more ED visits, without a suicide-related primary diagnosis and reported residence in the East County.

Implications for Research The rate of suicide has remained static for decades despite community outreach programs and implementation of suicide screening in the ED. It is

imperative to understand the relationships biological, psychological, and sociocultural factors and ED care have on suicide mortality in high-risk patients.

Keywords: suicide risk assessment, suicide mortality, emergency department

Dedication

This dissertation research is humbly dedicated to those who have lost their lives due to suicide.

"Anything that's human is mentionable, and anything that is mentionable can be more manageable. When we can talk about our feelings, they become less overwhelming, less upsetting, and less scary.

The people we trust with that important talk can help us know that we are not alone."

Fred Rogers

Preface

"Feeling gratitude and not expressing it is like wrapping a present and not giving it."

William Arthur Ward

I would like to express my appreciation to my dissertation committee; Dr. Ruth Bush, Dr. Michael Terry and Dr. Brenda Boone. Your encouragement, guidance and sage advice were instrumental in my successful completion of this research. Particularly my chair, Dr. Ruth Bush. Your brilliance, passion for statistics and wit is matched by none. Thank you for allowing me to challenge myself with this study and grow as a researcher. To the University of San Diego Hahn School of Nursing and Health Science faculty, thank you for imparting such an immense amount of knowledge while simultaneously teaching that I still have much to learn. I have special gratitude towards Dr. Ann Mayo and Dr. Eileen Fry-Bowers for their mentorship and guidance during the transformation of two academic papers into published manuscripts. To my diverse and talented cohort, I thoroughly enjoyed our time together and look forward to future collaborations. Thank you to Sharp Healthcare and the Caster Institute for Nursing Excellence for recognizing the value in nursing education and providing generous scholarship support.

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Suicide is the 10th leading cause of death in the United States (Heron, 2019) and has held this position since 2008 (Hedegaard et al., 2018). From 1999 to 2017, the suicide rate increased 33% (Hedegaard et al., 2018) and continues to rise annually. In 2018, 48,344 people lost their lives to suicide, a 1,171 person increase in suicides compared to 2017 (Dastagir, 2020). Moreover, many more Americans contemplate or attempt suicide every year. In 2017, 10.6 million adults reported serious suicidal thoughts; 3.2 million devised a plan, and 1.4 million made an attempt (Centers for Disease Control and Prevention [CDC], 2019).

Emergency departments (ED) play a critical role in the detection of suicidal ideation and suicide prevention. In response to the rising suicide rate and the pivotal role of EDs, The Joint Commission (TJC) National Patient Safety Goal 15.01.01 is aimed at reducing the risk of suicide by mandating screening of all patients with a behavioral health complaint for suicidal ideation (TJC, 2020). This screening is critical to the prevention of suicide because many victims of suicide have had interactions with healthcare providers within a year of suicide (Ahmedani et al., 2014). For example, 39% of California suicide victims had been seen in an ED the prior year (Baraff et al., 2006).

Previous research on this phenomenon has focused on mortality of patients treated in the ED who had a diagnosis of suicidal ideation or self-harm (Goldman-Mellor et al., 2019) or examined the characteristics of clinic and ED visits of patients within one year of suicide death including sensitivity of universal suicide screening (Stuck et al., 2017). To date, research has not focused on suicide rates of all adult ED patients in an integrated healthcare system regardless of chief complaint with an examination of variables that are associated with an increased risk of suicide.

Research Aims

The purpose of this study is to identify and describe relationships among biological, psychological, and sociocultural factors, and ED care among discharged ED patients who were treated in one of four EDs of an integrated healthcare system from March 1, 2015 to March 31, 2019 and describe the association of these variables on subsequent suicide mortality.

Study Question: What is the suicide mortality rate of ED patients and what biological, psychological, and sociocultural factors and ED care are associated with this rate?

Aim 1: To describe biological, psychological, sociocultural, and ED care factors among discharged ED patients who subsequently expired due to suicide.

Aim 2: To describe the relationships among biological, psychological, sociocultural, and ED care factors among discharged ED patients who subsequently expired due to suicide.

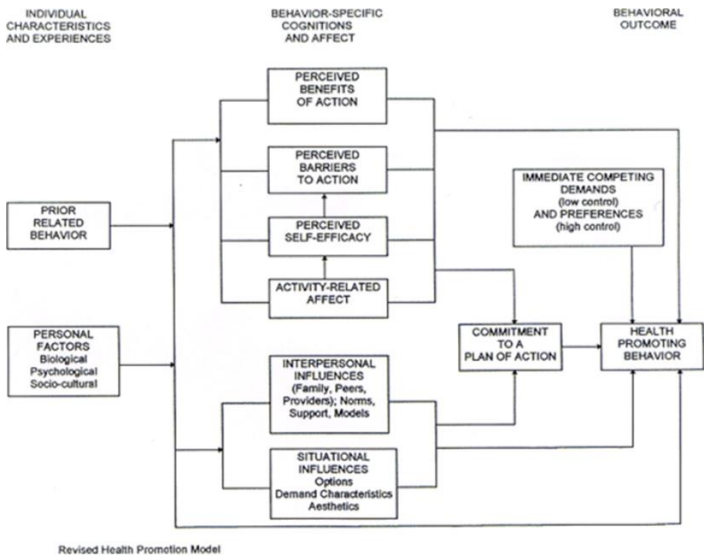
Aim 3: To determine the odds of suicide death controlling for biological, psychological, sociocultural, and ED care factors.

Theoretical Model

The relationships among the variables in this study were influenced by Pender's Model of Health Promotion (see Figure 1). This flexible, middle range theory describes how an individual's characteristics and experiences lead to their behavior choices and subsequently influence nursing interventions for health and wellbeing promotion (Peterson & Bredow, 2017). The model emphasizes the individuality, complexity, and dynamic nature of health promotion (Petiprin, 2016). In the model, there are personal influencers such as biological, psychological, and sociocultural factors impacting the behavior of health care providers (Pender, 1996). In turn, actions of the health care providers affect the individual's health promoting behavior and subsequent health outcomes.

Figure 1

Pender's Model of Health Promotion (Pender, 1996)

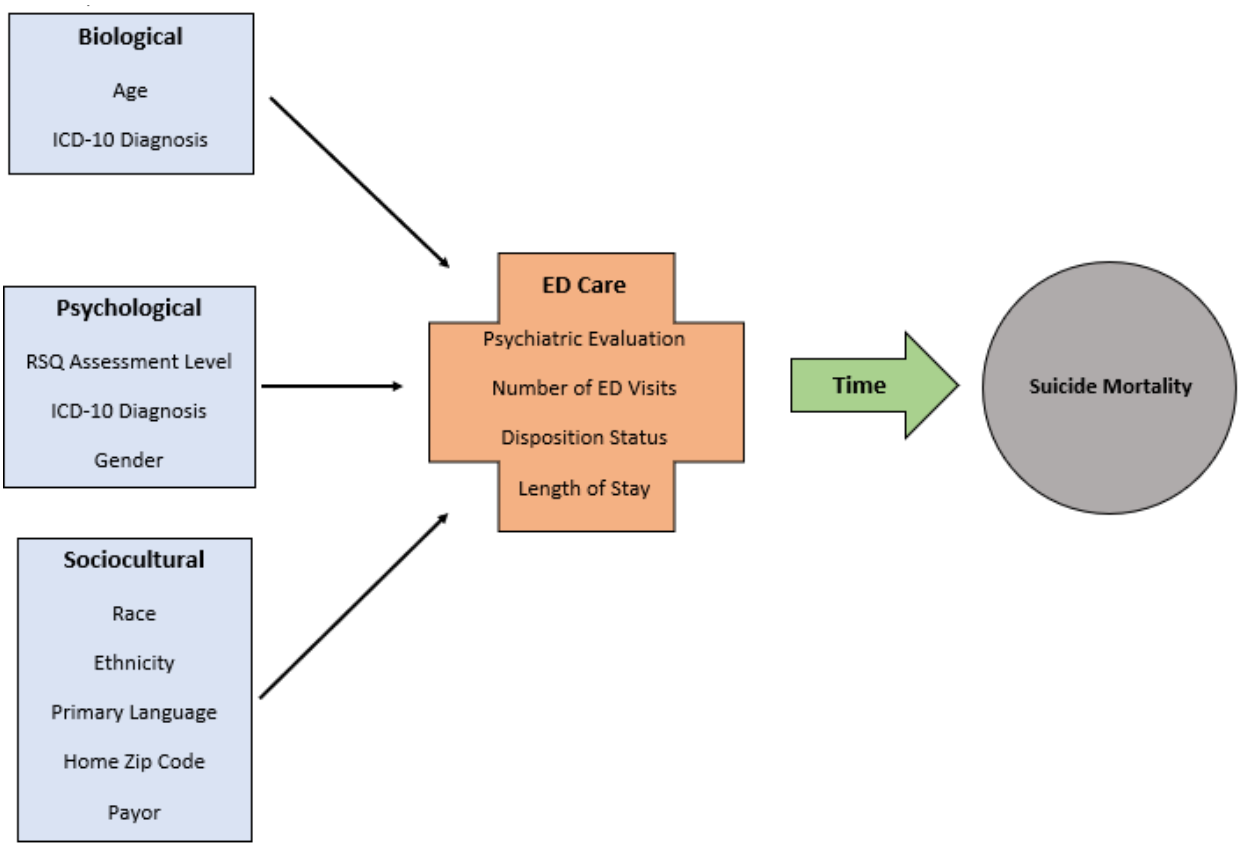


Research Conceptual Framework

The research conceptual framework captures relationships among independent variables and their association on the dependent variable of suicide mortality (see Figure 2). Consistent with Pender's Model of Health Promotion, there are biological, psychological, and sociocultural factors affecting behavior of health care providers, which subsequently lead to health promotion. For this research proposal, biological factors include age and ICD-9/ICD-10 diagnosis; psychological factors include Risk of Suicide Questionnaire (RSQ) assessment level, ICD-9/ICD-10 diagnosis and gender; and sociocultural factors include race, ethnicity, primary language, home zip code, and payor. These variables impact behavior and actions of ED care providers including decisions for psychiatric evaluation and disposition status and the patient's decision on frequency of ED visits. Because health promotion is dynamic and timebound, time is the last independent variable and represents amount of time between last ED visit and suicide mortality.

Figure 2

Conceptual Framework



Chapter 2

Suicide

The Centers for Disease Control and Prevention (CDC) define suicide as "death caused by self-directed injurious behavior with any intent to die as a result of the behavior" (Crosby et al., 2011, p. 23). As the 10th leading cause of death for all ages (Heron, 2019), suicide is a national health concern. Suicide is the second leading cause of death for individuals aged 10–34, fourth for those aged 35–54, and eighth for those aged 55–64 (Hedegaard et al., 2020). Suicide rate generally increases with age, but chronic conditions and cancers influence suicide's ranking in leading causes of death for older populations. In 2018, 48,344 people lost their lives to suicide (Dastagir, 2020), which is triple the number of homicides during the same period (US Department of Justice & Federal Bureau of Investigations, 2019). Not only is the loss of 132 individuals daily devastating, but suicide also carries a strong economic impact. In 2013, suicides cost the United States $50.8 billion in health care costs and lost work (Florence et al., 2015). However, when the amount is adjusted for underreporting, the 2013 estimate increases to $93.5 billion (Shepard et al., 2015). Despite loss of life and financial impact, efforts to slow or thwart rates of suicide have been unsuccessful. Suicide has been the tenth leading cause of death since 2008 (Hedegaard et al., 2018). Moreover, the age adjusted suicide rate has increased 31% from 2001 to 2017 from 10.7 to 14.0 per 100,000 people (National Institute of Mental Health, 2019b). In 2019, suicide rates ranged from 8.4 to 29.7 per 100,000 across the United States with a median rate of 14.5 (United Health Foundation, 2020). California has one of the lowest suicide rates in the nation at 11 per 100,000 people in 2018 (United Health Foundation, 2020) but in San Diego County the rate is higher than the national average at 16.1 per 100,000 people and has remained relatively static since 2003 (Smith, 2019).

Nationally, certain groups are statistically more susceptible to suicide including men, American Indian/Alaska Natives, White non-Hispanics, individuals over the age of 65, Veterans, rural residents, and LGBTQ individuals (United Health Foundation, 2020). Since 1999, men have consistently had a 3.5-4.5 times higher suicide rate compared to women (Hedegaard et al., 2018). According to an analysis of 2014 national data, suicide rates are highest for non-Hispanic American Indian or Alaska Natives (8.7 per 100,000) and non-Hispanic Whites (7.5 per 100,000) and lowest for non-Hispanic Asian or Pacific Islanders (3.5 per 100,000), Hispanics (2.5 per 100,000), and non-Hispanic Black individuals (2.1 per 100,000) (Curtin & Warner, 2016). By gender, men above age 75 have the highest rate (39.7 per 100,000) compared to any other age group and for women, the age with the highest rate is 45–64 years (9.7 per 100,000) (Hedegaard et al., 2018). Veterans also experience a well-documented increased risk of suicide with a suicide rate 1.5 times higher than non-veterans (United Health Foundation, 2020). Suicide rates in rural areas are 1.8 times that in urban areas (20 per 100,000 versus 11.1 per 100,000 respectively) with suicide rate increasing as level of urbanization decreases (Hedegaard et al., 2018). It is difficult to capture suicide rates for LGBTQ individuals because sexual orientation is not captured in national databases, but retrospective studies have estimated rates of suicide for LGTBQ individuals as 2–7 times higher than heterosexual and cisgender individuals (Haas et al., 2010). Some suicide trends in San Diego mimic national rates. In 2018, 57% of all suicides were White men and the east region of the county had highest rate (Smith, 2019). In San Diego, White non-Hispanic men have a suicide rate at 22.1 per 100,000, followed by Asian Pacific Islanders (8.2 per 100,000), Hispanics (6.5 per 100,000) and Black individuals (6.1 per 100,000) (Smith, 2019). When examining age groups based on gender, men above age 80 have highest rates at 62.5 per 100,000 and women aged 60–69 have highest rates at 12.1 per 100,000 (Smith, 2019). In San

Diego, East County, which is the most rural area of the county, has the highest suicide rate at 18.5 per 100,000 (Smith, 2019). Individual level of risk factors for suicide include depression; chronic pain; history of suicide attempt; family histories of mental health conditions or substance abuse disorder, suicide, or family violence; access to firearms; recent release from incarceration; or exposure to suicide behavior (National Institute of Mental Health, 2019a).

Both nationally and in San Diego, firearms are the most common method for suicide followed by hanging/suffocation and then drugs/alcohol/poisoning (National Institute of Mental Health, 2019b; Smith, 2019) for both men and women. In San Diego County, most common methods for men in descending order are firearms, hanging/suffocation, jumping, other methods, drugs/alcohol, and cutting/stabbing (Smith, 2019). For women, it is drugs/alcohol, hanging/suffocation, jumping, other methods, firearms, and cutting/stabbing (Smith, 2019).

Allostatic Load

The concept of allostatic load (AL) was first discussed by McEwen (1998) who identified and described life stressors' impact on health due to physiological responses to stress. This wear and tear on the body depletes resources and results in a diminished ability to deal with new stresses (Rosemberg et al., 2017) resulting in an increased susceptibility to disease and mortality. Literature has identified several contributors such as racism, lower socioeconomic status, "social challenges" such as the loss of a spouse (Rosemberg et al., 2017, p. 5193), and social adversity such as economic disadvantage and discrimination (Berger et al., 2015). Researchers have identified several biomarkers to measure AL including neuroendocrine, immune/inflammatory, anthropometric, metabolic, cardiovascular, and respiratory indicators (Berger et al., 2015). Common measures include cortisol, dehydroepiandrosterone, adrenalin, noradrenaline, c-reactive protein, fibrinogen, waist/hip ratio, high-density lipoprotein,

glycosylated hemoglobin, systolic blood pressure, and diastolic blood pressure (Berger et al., 2015). Allostatic load is an important new concept because the impact of chronic stress may be overlooked in mental health (Juster et al., 2018). Juster et al. (2018) conducted a study examining biomarkers in psychiatric patients and compared with sex-age matched hospital workers and found psychiatric patients had a 1.06 higher AL per measured biomarkers than hospital workers ($p = 0.02$). Evaluating AL could be another measure to determine risk of suicide as undercompensating for chronic stress may lead to feelings of being overwhelmed which subsequently increases risk of suicide (Juster et al., 2018).

Suicidal Ideation, Self-Harm, and Attempt

The definition of suicidal ideation includes "suicidal ideas or overwhelming desire to commit suicide" (Pam, 2013, para. 1). In contrast, suicidal self-directed violence is "behavior that is self-directed and deliberately results in injury or the potential for injury to oneself" with evidence of intent (Crosby et al., 2011, p. 21). A suicide attempt includes "non-fatal self-directed potentially injurious behavior with any intent to die as a result of the behavior" which "may or may not result in injury" (Crosby et al., 2011, p. 21). These behaviors are well-documented antecedents to suicide with occurrence of prior suicide ideation and self-harm increasing risks of suicide (Choi, et al., 2012; Cruz et al., 2012, Goldman-Mellor et al., 2019; Olfson et al., 2018). In 2017, 10.6 million adults reported serious suicidal thoughts, 3.2 million devised a plan, and 1.4 million made an attempt (CDC, 2019). Because 60% of movement toward attempt from ideation occurs in the first year (Chakravarthy et al., 2014), there is opportunity to prevent loss of life with detection and timely interventions.

Suicide Prevention

Although precipitating events to suicide are often complex, there is research to indicate with intervention, suicide is a preventable death (Betz et al., 2013; Nydam & Soole, 2017; Stone et al., 2017). Individual, relationship, and community contributors to suicide risk can be further influenced by the person's demographic and socioeconomic status (Stone et al., 2017). Therefore, suicide prevention strategies need to be robust and comprehensive and include individual, relationship-driven, and societal contributors to suicidal behavior. A key recommendation by the National Center for Injury Prevention and Control is identification of those with suicide risk and providing timely interventions (Stone et al., 2017). Healthcare providers can play a pivotal role in this detection and intervention.

Research indicates many suicide victims interact with healthcare providers within a year prior to their death with estimates as high as 83% of suicide victims (Ahmedani et al., 2014). In a California study, 39% of suicide victims had been seen in the ED the prior year (Baraff et al., 2006). In a study conducted in England, one of the few comparable studies, this rate was 43% (Cruz et al., 2011). Moreover, in Cruz et al. (2011), 12% of suicide victims were frequent attenders (more than three visits) and were 2.5 times more likely to die by suicide within a month of ED discharge (OR 2.57, 95% CI 1.15-5.74). Additionally, up to 69% of suicide victims may visit the ED for reasons other than self-harm such as medical complaints, physical traumas, or psychiatric reasons, but this has not been studied recently (Gairin et al., 2003). In Claassen and Larkin's (2005) seminal study of occult suicidality among ED patients, 11% reported passive ideation and 8% admitted suicidal ideation indicating robust screening is necessary. In 2017–2018, 13% of ED visits were related to suicide ideation, self-directed violence, or both, and the rate increased 25.5% during the same period (Zwald et al., 2020). Although all healthcare

providers can help to prevent suicide, EDs play a critical role in detection of suicidal ideation and subsequent prevention of suicide. Due to prevalence of suicide ideation among ED patients and rates of suicide following healthcare interaction, the Emergency Nurses Association (ENA) and The Joint Commission (TJC) recommend universal screening of all ED patients with a behavioral health complaint (ENA, 2017; TJC, 2020).

Suicide Risk Assessment

EDs play a critical role in detection of suicidal ideation and suicide prevention. However, variations in systems, structures, and processes of identification and assessment of suicide ideation stifles their capability. TJC implemented National Patient Safety Goal 15.01.01 in attempt to standardize practices and capitalize on the pivotal role EDs play in suicide prevention (TJC, 2020). This safety goal is aimed at reducing risk of suicide through mandated screening of all patients with a behavioral health complaint for suicidal ideation (TJC, 2020). Although EDs have prerogative on which assessment instrument they implement, ENA recommends use of one of the following five established instruments (ENA, 2017): The Ask Suicide Screening Questionnaire (ASQ), the Manchester Self-Harm Rule (MSHR), the Risk of Suicide Questionnaire (RSQ), the Patient Safety Screener (PSS) or the Suicide Affect-Behavior-Cognition Scale (SABCS). Given the dynamic and fast paced environment of the ED, these brief instruments are intended to be an initial triage screening to identify patients with a potential suicide risk but do not replace thorough evaluation of those identified as high risk. However, further evaluation and coordination of post-discharge care and resources remains a gap for many EDs. To evaluate ED practices, the Emergency Department Safety Assessment and Follow-Up Evaluation (ED-SAFE) survey included eight EDs in seven states with more than 600 responses (Betz et al., 2013). Over 80% of surveyed providers (nurse, staff/attending physician, resident

physician) reported confidence in screening for suicidality, but far fewer reported confidence in assessing risk severity, counsel, creating a safety plan, or securing referral resources for after care (Betz et al., 2013). This is a critical gap because EDs contribute to patient safety by facilitating care post discharge (Goldman-Mellor et al., 2019). Post discharge care may include discharge home, admittance to a general hospital, or transfer to a psychiatric facility for either inpatient or outpatient care. Given the episodic nature of ED care, it is difficult for ED providers to assess effectiveness of ED interventions and discharge planning.

Emergency Departments

EDs are complex care environments providing care for individuals across the lifespan who present with a variety of complaints and concerns. The immediate care goal is prompt evaluation, stabilization, treatment, and discharge or transfer out of the department. Care provided is episodic and task focused with efficiency and speed valued. This care delivery model may be effective for patients with medical complaints; however, it may not be ideal for those with non-somatic complaints including suicidal ideation. Patients with suicidal ideation require a different care approach because they may not require as many clinical tasks and have significantly longer lengths of stay.

Length of Stay and Care

In one survey, 88% of all extremely long ED lengths of stay (over 24 hours) were patients with mental health complaints (Stephens et al., 2014). Another study reported 3.2 times longer length of stay for those with mental health complaints than other general patients (Nicks & Manthey, 2012). These extensive lengths of stay are referred to as boarding and are impactful to both patients and healthcare providers. In patients, boarding can exacerbate symptoms due to the chaotic environment of an emergency department and lack of psychiatric care. Glickman and

Sisti (2019) report that 62% of boarded patients receive zero mental health services during their boarding. For nurses, long lengths of stay require different nursing care than what is typically provided in the ED. The average length of stay in the ED is less than four hours (Rui et al., 2016) and stays beyond this require a different plan of care compared to typical ED patients. This may include administration of maintenance medications, addressing dietary needs, and activities of daily living. Many EDs lack systems, structures, and training to provide such care. Additionally, ED nurses may lack skills, knowledge, or experience to treat effectively this patient population because most of their training focuses on acute medical management. These issues raise concerns about quality of care offered in the ED to patients with suicidal ideation (Alakeson et al., 2010). For example, rates of suicide and suicide attempts of patients screened or seen in the ED with suicidal ideation is higher than population suicide rates (Crandall et al., 2006), despite care provided in the ED or subsequent referrals, indicating a gap in either detection or prevention.

Physician care provided in the ED typically includes a comprehensive risk assessment, brief interventions, and discharge planning (Betz & Boudreaux, 2016). Disposition destinations for patients post evaluation include discharge to home, general hospital inpatient admission, or psychiatric inpatient admission. Patients often experience long waits for inpatient psychiatric beds, referred to as boarding, which is impactful to providers, healthcare organizations, and patients. As patients wait up to 24 hours for transfer, providers may reevaluate patients for a decrease in level of risk, which could update their discharge plan. For example, a patient's order for transfer to an inpatient facility may be cancelled if the patient is reassessed and determined to be stable and improved. However, this may be a risky decision for providers to make and one that would not be made if the patient's length of stay were significantly shorter or if transfer to an inpatient facility was not universally challenging. In a study on reassessment and release of

boarded ED patients with mental health complaints, patients who were discharged after boarding for inpatient bed placement had a higher rate of return to the ED at both 30 days and 12 months compared to those without a bed request or who were admitted from the ED (Lee et al., 2018). Additionally, reasons for revisit to the ED were more likely to be for a psychiatric or suicidal complaint (Lee et al., 2018). Return visits can indicate a potential gap in treatment and discharge planning during their index visit.

Psychiatric Evaluations

One aspect of ED care contributing to extended lengths of stay are psychiatric evaluations. ED physicians are critical care providers and lack the detailed training in psychiatry that is necessary to complete in-depth risk assessments of patients with suicidal ideation, counsel patients, or create safety plans for discharge (Betz et al., 2013). Therefore, many ED providers rely on psychiatric evaluations for assessment of high-risk patients. At minimum, these evaluations include a preliminary diagnosis and plan of care (National Alliance on Mental Illness [NAMI], 2020) and may also include collateral interviews from patients' families, creating a safety plan, securing follow-up care, and direct communication to follow-up care providers (Simpson & Monroe, 2018).

In the ED, a psychiatric evaluation is typically completed by a Psychiatric Evaluation Team (PET) member. This team consists of mental health specialists who have more psychiatric training than ED providers have and often have more time to complete a thorough assessment (Betz & Boudreaux, 2016). After evaluation of the patient, the PET provider will make plan of care recommendations to the ED provider including medication management, level of suicide risk, and disposition suggestions for a safe discharge. PET providers may be employees of the county, hospital, or a private company, and their response time to a psychiatric evaluation

request ranges from 1.61 to 4.36 hours (Stone et al., 2012). A timely psychiatric evaluation by PET is critical because it directly contributes to these patients' length of stay, can decrease boarding time in the ED and is a critical component in discharge planning.

Delayed response time can be due to limited resources, lack of coverage, or geographical barriers (Chakrabarti, 2015). Endorsed by the American Psychiatric Association (2020), telepsychiatry has been a long-standing solution to these barriers and is demonstrated to be comparable to in-person evaluations (Chakrabarti, 2015). However, organizational resistance and insurance regulations prevented full implementation of telepsychiatry (Shore et al., 2020), including on-demand psychiatric evaluations in the ED. Due to COVID-19, regulations have been updated to allow for rapid expansion of telepsychiatry (Shore et al., 2020) and social distance restrictions has forced swift evolution of providers. Although it is unknown what COVID-19 innovations will remain post-pandemic, telepsychiatry for psychiatric evaluations is a solution that should be carried forward to decrease response time for PET evaluations, decrease length of stay and ED boarding times, and ultimately improve patient outcomes.

Disparities in Care

Research studies conducted on experiences of patients with suicidal ideation reveal care disparities compared to patients with somatic complaints. For example, they often do not receive the same level of attention from staff, resources, or compassion as those with physiological symptoms (Betz et al., 2013). This can be extremely detrimental to those with thoughts of self-harm because it could worsen their perception of themselves, negatively affect care (Larkin et al., 2009), and deter them from seeking assistance in the ED for psychiatric complaints in the future (Harris et al., 2016). It is theorized this disparity in care is the result of competing priorities in the ED and lack of adequate staff training and education for psychiatric treatment

(Betz et al., 2013; Larkin et al., 2009; Oordt et al., 2009). Furthermore, nurses are not immune to implicit biases and stigma that surround mental health (Betz et al., 2013) which has the potential to be perceived as a poor attitude and apathy toward patients with suicidal ideation (Harris et al., 2016). To decrease boarding and provide more specialized evaluation and treatment, some communities are implementing dedicated psychiatric units.

Psychiatric Units

ED psychiatric units may be imbedded in an emergency department or a standalone psychiatric emergency services (PES) facility often affiliated with a medical ED. PES are aimed to decrease ED boarding and improve patient experience while providing evaluation, treatment, and stabilization in an outpatient setting (Zeller et al., 2014). These units can accept transfers from other EDs, direct patient presentations, and law enforcement referrals (Levin-Epstein, 2015). Staffing is dependent on whether they are a freestanding PES or an embedded unit in an ED and may include ED physicians, ED nurses, social workers, psychiatric nurses, psychiatrists, or psychiatric techs (Alakeson et al., 2010). These providers often have more advanced training and knowledge in psychiatric care than what is typical for ED providers, which can improve quality of care. For example, they have capability to discern between psychiatric emergencies and effects of drugs or alcohol, which is instrumental in providing appropriate care, and follow up services (Alakeson et al., 2010). These units provide specialty care in a healing environment, protect patient privacy and dignity, decrease cost compared to boarding in a medical ED, and improve staff safety (Levin-Epstein, 2015).

There is limited research on impacts of PES but results are promising. One study demonstrated an 80% reduction in boarding and avoidance of inpatient admission in 75% of involuntary psychiatric holds for patients receiving treatment in a PES (Zeller et al., 2014).

Additionally, PES may decrease healthcare organization and provider liability and increase community capability to provide care (Levin-Epstein, 2015). Although PES are a hopeful solution to care gaps experienced by patients, they are not without staffing and resource issues such as census limitations (Levin-Epstein, 2015). Furthermore, in a recent survey, only 36% of EDs reported having a PES or embedded unit (Levin-Epstein, 2015), indicating many communities are without this option. Until their use becomes widespread, EDs will continue to be primary providers of outpatient psychiatric care.

Policy

National Policies

One of the largest barriers to mental health care is lack of parity between mental health and physical health coverage and access. The Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA) improved mental health benefit parity at the federal level by requiring private insurance plans to provide mental health and substance use coverage on par with medical coverage (Cummings et al., 2013). Initially, this law applied to group health plans through employers but was expanded to individual plans with passage of the Patient Protection and Affordable Care Act in 2010 (Centers for Medicare and Medicaid Services [CMS], n.d.). The intent of MHPAEA was to close coverage barriers for individuals and support provider reimbursement to improve access to mental health services. However, the MHPAEA failed to deliver and improving parity to Medicaid population began with Patient Protection and Affordable Care Act of 2010.

Under the Patient Protection and Affordable Care Act, mental health and substance use disorder (SUD) coverage was included as an essential health benefit in state benefit packages sold in state marketplaces (Cummings et al., 2013), and since 2013 an additional 14.7 million

individuals have enrolled in Medicaid (Medicaid and CHIP Payment and Access Commission [MACPAC], 2020). This has been a leap in improving coverage for mental health services. However, coverage does not equate with actualization of treatment when exclusions and limitations still exist such as the Medicaid Institutions for Mental Disease (IMD) Exclusion Rule. Implemented in 1965, the IMD Exclusion Rule blocks federal payment for Medicaid beneficiaries ages 21–64 for inpatient care at an institution of mental disease, which is defined as a mental health treatment facility with more than 16 beds (Rosenbaum et al., 2002). The IMD Exclusion Rule creates barriers for inpatient psychiatric treatment, affecting placement from the ED and directly contributing to increased boarding. In a step toward closing this gap, Medicaid Emergency Psychiatric Demonstration (MEPD) provided $75 million in Medicaid funding for inpatient psychiatric care in 11 states and the District of Columbia, effectively suspending the IMD Exclusion Rule from 2012 to 2015 in these states. This temporary suspension of the IMD Exclusion Rule not only allowed temporary Medicaid reimbursement but also permitted a long overdue evaluation of the rule. During the suspension, evaluation of MEPD revealed little to no support for the hypothesis that suspension of the IMD Exclusion Rule results in increase in admissions or length of stay (Glickman & Sisti, 2019), which were the precipitating justifications for the rule's enactment. However, MEPD also did not demonstrate an increase in ED visits or length of stay (Blyler et al., 2016). This may be because MEPD did not include patients with substance-related disorders or mental health complaints beyond those who presented as a danger to self or others (Blyler et al., 2016).

In addition to national and state laws to address parity of mental health care, there is also a National Strategy for Suicide Prevention. This began in 2012 with a goal to save 20,000 lives in five years through the implementation of 13 goals and 60 objectives (Action Alliance for

Suicide Prevention, 2012). Now in its 10th year, the Action Alliance has over 250 partners throughout the United States with goals of transforming health care systems, communities, and stigma reduction (Action Alliance for Suicide Prevention, 2020). In addition to sweeping reforms, the suicide rate of certain groups such as youth, rural residents and veterans is being addressed.

Rural Areas

Individuals residing in rural areas are more susceptible to suicide and several policy recommendations address this. One key strategy for suicide prevention is increasing access in rural areas because half of all counties in the United States lack accessible mental health professionals (Centers for Disease Control and Prevention [CDC], 2018). Policy recommendations to address this include integration of primary care with mental health care, increased telepsychiatry access, and increased coverage for mental health coverage (CDC, 2018). Integration of mental health services with primary care delivery increases screening and access to care without increasing mental health providers. However, it needs to be coupled with enhanced mental health education and training for primary care providers and additional systems and structures to support these providers, which can be a barrier to full implementation, especially in smaller, private practices. As demonstrated with emergency department use, telepsychiatry is another strategy because it helps improve access to mental health professionals who are limited by availability of providers and/or geographical barriers (Chakrabarti, 2015). Finally, insurance coverage is an antecedent to receiving mental health services and rural residents are less likely to have adequate coverage. It is estimated that 12.3% of Americans residing in rural areas, compared to 10.1% in urban areas, are uninsured or underinsured (Day, 2019). Increasing coverage is key strategy to improving health outcomes, including suicide

prevention. In states that passed legislation improving coverage for mental health services, suicide rates decreased 5% in those states (Lang, 2011).

Veterans

Veterans are another population more at risk for suicide and several interventions address this. The Joshua Omvig Veterans Suicide Prevention Act of 2007 implemented robust suicide prevention strategies for veterans, including training for Veterans Affairs employees, mental health assessments of veterans, care for those with histories of sexual abuse, designated suicide prevention counselors at each medical facility, 24-hour availability of services, a tollfree hotline, and community outreach (United States Congress, 2007). Additionally, the Department of Defense Suicide Prevention Policy has also been implemented to reduce suicide of service men and women by raising awareness, commander training, limiting access to lethal means for those at risk, and standardize data and reporting (Department of Defense [DoD], 2017). However, veterans still suffer suicide at a rate 1.5 times higher than non-veterans (United Health Foundation, 2020), indicating these strategies have not been entirely successful in reducing veteran suicide.

Research Gap

Even in integrated healthcare systems, ED care is episodic and providers do not know fate of their patients after discharge. This can make it challenging to assess effectiveness of ED care and care transitions. Without such knowledge, ED providers cannot identify which individuals are at highest risk of poor outcomes nor begin to understand impacts of certain risk factors. In regard to suicide mortality, few studies have helped close this knowledge gap. Goldman-Mellor et al. (2019) conducted a retrospective cohort study assessing mortality of California's residents who had been treated in an ED for deliberate self-harm or suicidal ideation

without self-harm and compared these groups to a reference group consisting of a random sample of 5% of the remaining ED patient population. Through linking records from the California Office of Statewide Health Planning and Development for ED visits to California Department of Public Health Vital Records, they calculated standardized mortality rates (SMR) for three patient groups and risk ratio for suicide mortality within one year of the ED index visit. In their study, highest probability of suicide was for self-harm patients, followed by those with suicidal ideation and reference ED patients, respectively (Goldman-Mellor et al., 2019). For patients with deliberate self-harm, there were 693.4 deaths per 100,000 person years (SMR 56.8). For patients with suicidal ideation, there were 384.5 deaths per 100,000 person years (SMR 31.4) and within the reference group, 23.4 deaths per 100,000 person years (SMR 1.9). Comparing the SMR to the matched California population, deliberate self-harm patients were 56 times more likely to die by suicide in one year (SMR 56.8, 95% CI, 52.1-61.4), those with suicide ideation 31 times more likely (SMR 31.4, 95% CI, 27.5-35.2) and reference patients had double the risk of suicide (SMR 1.9, 95% CI, 1.6-2.3). Men and those over the age of 65 were more likely to die by suicide in both deliberate self-harm and suicidal ideation groups. Increased risk of suicide for all three patient groups supports importance of universal suicide screening for all ED patients (Goldman-Mellor et al., 2019). Furthermore, it is imperative follow up care is secured for those individuals presenting with deliberate self-harm or suicidal ideation (Goldman-Mellor et al., 2019). Due to coding methodology, it is not known if those with deliberate self-harm had intent to die (Goldman-Mellor et al., 2019) and therefore difficult to assess suicide risk of this group at the time of their ED visit.

Stuck and colleagues (2017) investigated suicide mortality of patients in an integrated healthcare system consisting of an ED and numerous outpatient clinics. The purpose of their

study was twofold; to assess impact of TJC mandatory suicide risk screening and investigate access to healthcare in the 12 months prior to suicide death (Stuck et al., 2017). During a 6-year time period of the 3,337 suicide deaths in San Diego County, 224 received health care in the setting's ED (95), one of their outpatient clinics (126), or as a direct admission (three) (Stuck et al., 2017). The authors did not include suicide rate for their healthcare system based on these occurrences nor the odds ratio. However, 79% of deaths occurred within seven months of a health care encounter, which is consistent with prior research about timing of suicide post health care visit (Ahmedani et al., 2014; Olfson et al., 2018). In this study, 29% of suicides occurred within 30 days of the visit (Stuck et al., 2017), which can be a key indicator of importance of timely post discharge follow-up care.

In 2011, this healthcare organization implemented TJC mandatory suicide screening. During the study time period of 2007–2013, of the 95 ED patients with suicide mortality, 36 patients screened negative for suicide risk; 16 prior to the 2011 TJC implementation, and 24 after (Stuck et al., 2017). The method of suicide screening at the study's setting is a 2-question universal screen consisting of "Do you feel like harming yourself?" and "Have you attempted to harm yourself in the past?" (Stuck et al., 2017, p. 872). A positive response to either question elicits a positive suicide screen and further evaluation. Although the authors do not reference a specific instrument, it appears that screening questions are based on Patient Safety Screener (PPS-2) (Boudreaux et al., 2015), which is one recommended instrument by ENA (2017). In a previous study in which PPS-2 was compared to the Beck Scale for Suicide Ideation (BSSI), overall agreement between the two instruments was strong (κ = 0.94, 95% CI .90, 1.00) (Boudreaux et al., 2015). However, there was more agreement on lifetime attempt (κ = 0.98, 95% CI 0.02-0.95) than active ideation (κ = 0.34, 95% CI 0.10-0.14) (Boudreaux et al., 2015),

indicating that the instrument may not be sensitive enough to capture those with suicidal ideation without prior attempt or passive ideation. In addition, it is not known if this modified version had reliability and validity testing, which could offer a further explanation for the high false negative rate reported in Stuck et al. (2017) study.

Both of these studies expand upon knowledge of suicide mortality, including those in an ED with diagnosis of suicidal ideation or self-harm (Goldman-Mellor et al., 2019) and the sensitivity of universal suicide screening (Stuck et al., 2017). Additionally, national, state, and local statistics provide information about trends, demographic, and socioeconomic factors that place individuals at a higher risk of suicide. To date, research has not focused on suicide rates of all adult patients in an integrated healthcare system and relationships among patient biological, psychological, and sociocultural factors; care provided in the ED; and suicide mortality.

Chapter 3

Research Design

This research analyzed existing records from the healthcare organization's electronic health record (EHR) and the San Diego County Medical Examiner's office using a retrospective comparative study design.

Setting

This was a multisite setting with four participating Emergency Departments (ED) in a not-for-profit, integrated healthcare system. All four EDs reside in a single county in Southern California. Average annual ED census ranges from 18,160 to 106,885 at each of the sites (see Table 1).

Table 1
ED Patient Volumes

	2015	2016	2017	2018	2019	Total	Annual Average
Site 1	16,063	17,750	18,811	18,380	19,796	90,800	18,160
Site 2	69,349	65,281	71,567	70,812	73,155	350,164	70,033
Site 3	107,016	108,243	106,058	104,679	108,281	534,277	106,885
Site 4	90,268	93,812	96,871	95,312	97,471	473,734	94,747

Sample

The sample included all adult ED patients who were treated in one of four sites from March 1, 2015 to March 31, 2019. These cases were compared with San Diego County Medical Examiner (SD ME) records of individuals with suicide as manner of death from March 1, 2015 to March 31, 2020 to identify matched cases. The balance of the ED cases accounted for the group who did not commit suicide. Inclusion criteria was patients over age 18 whose registrations for demographic information were completed prior to discharge. Patients who left prior to triage assessment or physician evaluation were excluded.

Sampling procedure

From 2015–2019, there were 65,971 ED patients with a psychiatric complaint per organization productivity dashboards. From 2015–2018, SD ME reported 1,776 individual suicides. If suicide rates in San Diego remain static, there will be an estimated 2,664 suicides in San Diego from 2015–2020. The timeframe of this study was selected based on implementation of Risk of Suicide Questionnaire (RSQ) within the system of interest and prior research examining suicide mortality within one year of interaction with healthcare providers (Ahmedani et al., 2014; Baraff et al., 2006, Gairin et al., 2003; Goldman-Mellor et al., 2019; Luoma et al., 2002; Miller et al., 2017; Olfson et al., 2018; Stuck et al., 2017) and also to minimize effects of seasonality in ED and avoid the confounder of COVID-19.

Sample Size

Anticipated sample size for this research proposal was determined based on prior knowledge of another research study conducted in San Diego in which 2.8% of suicide cases (*n* = 224) in San Diego from 2007–2013 previously visited a healthcare system's EDs (Stuck et al., 2017). Because this study has four times the number of ED sites, with one being a low volume site, estimated sample size for this study was 75–223 individual cases.

Variables and Operational Definitions

The independent variables in this study included patient demographics, level of RSQ suicide risk, ED care provided, patient diagnosis, frequency of ED visits, disposition status, and length of time between ED discharge and date of death.

Demographics

Patient demographics were captured by Patient Access Services at time of ED registration. For this study's purpose, variables obtained for analysis included age, gender, race,

ethnicity, primary language, home zip code, and payor. Patient names and dates of birth were also obtained for purposes of identifying SD ME cases of expiration due to suicide.

Suicide Risk

Suicide risk is determined by the Risk of Suicide Questionnaire (RSQ) score generated from the ED Suicide Risk Assessment, which is completed on behavioral health patients during their triage assessment (see Appendix B). The primary screening question is mandatory for all patients with an ED triage assessment and states, "Does the patient have a psychological, behavioral, substance abuse complaint or a history?" A "yes" cues completion of the RSQ with points associated with each affirmative answer to the questions; "Are you here because you tried to hurt yourself?" (1 point); "In the past week, have you been having thoughts about killing yourself?" (1 point); "Have you ever tried to hurt yourself in the past?" (1 point); "Has something very stressful happened to you in the past few weeks? (A situation that has been very hard to handle?)" (1 point). After a positive screening, scores range is 0–4 with a score above two indicating a risk and implements the organization's Suicide at Risk Prevention Program.

The process for completing RSQ varies from entity to entity, the patient's location at time of triage (triage bay, ambulance gurney, or ED room), acuity of patient, and individual provider practices who complete the assessment. These factors dictate whether the ED nurse explicitly verbalizes assessment-screening questions or infers answers based on patient history, medication, or chief complaint.

ED Care

Although components of ED care are complex, for the purposes of this research proposal, ED care was limited to the order of a psychiatric evaluation (PET) by the ED physician during the patient's ED visit.

Patient Diagnosis

Patient diagnosis was used to capture both biological and psychological factors. This was determined by final billing primary ICD-9 (2015) or ICD-10 (2015–2019) code diagnosis generated from provider documentation.

Frequency of ED Visits

For cases with multiple visits during the study period, frequency of ED visits was defined as a numerical count of visits. For patients with multiple visits, visit date closest to date of death was the reference visit.

Disposition Status

Disposition status was captured in the EHR by the discharging ED RN's documentation in the ED departure note. Although there are numerous options, anticipated groupings were home, admitted (behavioral or general hospital), transfer (behavioral or general hospital), and other. However, these categories were adjusted based on data.

Length of Stay in ED

Length of stay while in the ED was also included as a variable due to prior research on impacts of boarding on patient experience and healthcare providers including as an influencer for decisions on inpatient psychiatric admission or transfer (Lee et al., 2018). Length of stay was calculated as difference in minutes from check in date and time and check out date and time.

Length of Time between ED Discharge and Date of Death

The length of time between ED discharge date and date of death was calculated as a count of days between the reference ED visit and date of death documented by the SD ME. For patients with multiple ED visits, the reference ED visit was the visit occurring closest to date of suicide death.

Suicide Mortality

The dependent variable of suicide mortality was determined by classification of suicide as manner of death by the SD ME and was scored as yes (1) or no (0). Individuals in the population data set not identified by the SD ME were presumed to have not expired due to suicide.

Instruments

One variable for this research study recorded in medical record is the RSQ (Horowitz et al., 2001). The RSQ is a 4-item screening tool and is a recommend instrument for screening for suicide ideation in ED patients (Emergency Nurses Association [ENA], 2017). The instrument was originally developed for use in children and adolescents (Horowitz et al., 2001) but its reliability and ability to generate valid data in adult populations has been evaluated (Folse et al., 2006). The instrument's reliability is suboptimal, $\alpha = 0.44$ (Folse & Hahn, 2009). In a 2006 study assessing the instrument's psychometrics found that question 1 "Are you here because you tried to hurt yourself?" and question 2 "In the past week, have you been having thoughts about killing yourself?" had strong inter-item correlations and question 3 "Have you ever tried to hurt yourself in the past?" and question 4 "Has something very stressful happened to you in the past few weeks? (A situation that has been very hard to handle?)" lacked correlations with other items (Folse et al., 2006). Validity was assessed in a follow up study, which found question 1 had a strong positive correlation of .86 with a suicide related diagnosis while the other questions had weak to no correlation (Folse & Hahn, 2019). During the instrument's development, the 4 questions demonstrated goodness of fit with a c statistic of .87 and a reported sensitivity of 0.97, specificity of 0.42, positive predicted value (PPV) of 0.56 and negative predicted value (NPV) of 0.94 (Horowitz et al., 2001). The instrument's high sensitivity, low specificity and low PPV

indicates a high false positive rate however a NPV of .94 indicates low false negative rate. While a high false positive may result in an unnecessary further evaluation of patients not at risk of suicide, it is more desirable that not detecting someone at risk. Additionally, in the instrument development and use in other research, suicide risk is defined as a score of 1, which is a lower threshold than the organization's criteria of a score of 2 or above.

Data Collection Plan

Data were requested from the healthcare organization for extraction from the EHR and included name, date of birth, and all independent variables for all adult ED patients with at least one ED visit from March 1, 2015 to March 31, 2019. These data were transferred to the researcher via a secure internal storage drive. From this data set, names and dates of birth were extracted and emailed to the SD ME via a secure server; additional variables were not shared with the SD ME. The SD ME provided reports on individuals with a suicide manner of death from March 1, 2015 to March 31, 2020 who were identified from the healthcare organizations' data set. The case reports were used to identify individuals in the ED dataset and cases were matched based on name, date of birth and gender and subsequently coded as 'yes' for suicide mortality and with a date of death documentation. Remaining cases were coded as 'no' for suicide mortality and used as a reference group. Once cases were identified, records were deidentified and each case was assigned sequential numbering. The original data set was secured in a password-protected external drive accessible only to the researcher. The master list of data was secured on a password-protected external drive only accessible to the researcher.

Data Analysis Plan

For Aim 1, the variables were described with descriptive statistics including counts, proportions, percentage, mean, mode, range, and standard deviation. For Aim 2, relationships

among suicide mortality and independent variables were described with appropriate bivariate statistics including *chi*-square, *t* test, and analysis of variance (ANOVA). For Aim 3, odds of suicide death as determined by independent variables with a bivariate relationship was determined by logistic regression for odds ratio. ED patients who did not expire due to suicide were used as a comparative group for the logistic regression. With 150 case patients and 1,231,500 control patients, and prior data indicating the probability of exposure among controls is 0.028; enabling detection of true odds ratios for a dependent variable of 004 or 3.582 in exposed subjects relative to unexposed subjects with probability (power) 0.95. The Type I error probability associated with this test of the null hypothesis that the odds ratio equals one is 0.05. An uncorrected *chi*-square statistic was used to test this null hypothesis (Dupont & Plummer, 1990).

Limitations

Study limitations include deaths that occur outside of San Diego County and suicides not identified as suicide by the SD ME were not captured in the sample. Additional limitations include dependency on accuracy of electronic documentation, which is susceptible to variation of provider assessment of the RSQ, accuracy of provider documentation of the RSQ, and recording of patient demographics by Patient Access Services (PAS). This study is also not immune to challenges of capturing accurate race, ethnicity, and gender information. These variables could be explicitly asked by the PAS team or inferred. Additionally, the organization captures only male, female, or unknown gender thus excluding individuals who are not cisgender. Final billing ICD-9 or ICD-10 can be influenced by reimbursement, training, and workflows, which were not controlled for. Finally, the RSQ instrument is the only standardized suicide risk assessment

completed in the healthcare organization's EHR and instrument psychometrics could limit interpretations of study results.

Summary

The purpose of this study was to identify and describe relationships among biological, psychological, and sociocultural factors, and ED care among discharged (ED) patients who were treated in one of four EDs of an integrated healthcare system from March 1, 2015 to March 31, 2019, and describe association of these variables on subsequent suicide mortality. This study also examined the sample's odds of death by suicide.

Chapter 4

The purpose of this study was to explore and describe relationships among biological, psychological, and sociocultural factors, and Emergency Department (ED) care among discharged (ED) patients. The sample consisted of individuals who were treated in one of four EDs of an integrated healthcare system from March 1, 2015 to March 31, 2019 and the analysis describes association of these variables on subsequent suicide mortality.

Study Question: What is the suicide mortality rate of ED patients and what biological, psychological, and sociocultural factors and ED care influence this rate?

Aim 1: To describe biological, psychological, sociocultural, and ED care factors among discharged ED patients who subsequently expired due to suicide.

Aim 2: To describe relationships among biological, psychological, sociocultural, and ED care factors among discharged ED patients who subsequently expired due to suicide.

Aim 3: To determine odds of suicide death controlling for biological, psychological, sociocultural, and ED care factors.

Data Examination

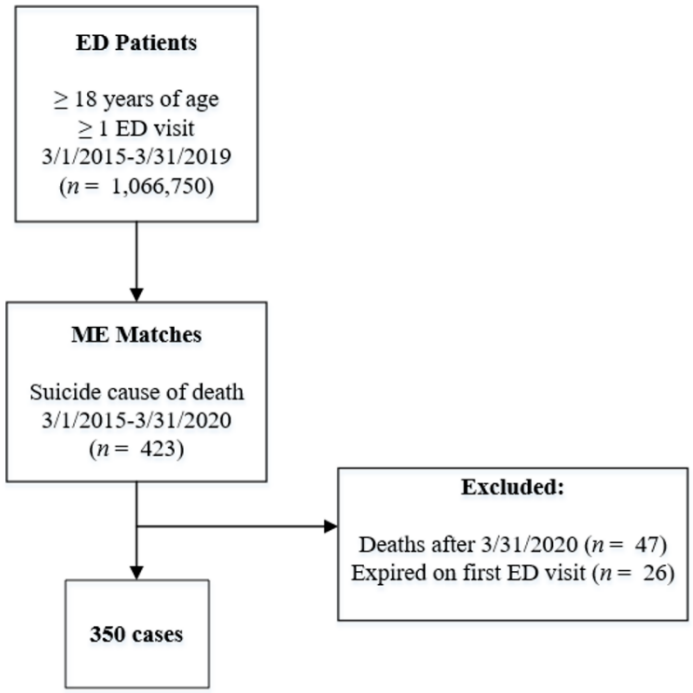
After approval from the university's and healthcare organization's Institutional Review Board (IRB), a formal data request was submitted to the healthcare organization's data analytics department. Information sought included demographics (patient name, date of birth, gender, race, ethnicity, primary language, home zip code, and payor), provider documentation (risk of suicide screening responses, primary billing diagnosis, presence of an order for psychiatric evaluation (PET), length of stay in the ED, and ED disposition status for adult patients with an ED visit from March 1, 2015 to March 31, 2019 to at least one of the healthcare organization's four EDs. During the study period, there were 1,066,750 unique adult patient visits at the four EDs.

Descriptive statistical analyses were completed on this sample to calculate frequencies for race, ethnicity, primary language, residential region, payor, billing diagnosis, and ED disposition status. The distribution of data within this larger dataset informed the categorization of variables including final billing diagnosis, ethnicity, race, zip code, payor and disposition status. For example, there were over 12,000 unique final billing diagnoses in the ED dataset, which were recoded as a dichotomous variable of suicide related and non-suicide related. This was accomplished by identifying billing diagnosis with the terms 'intentional', 'self-harm', 'suicide', and 'suicidal' to identify suicide related billing diagnoses. All other diagnoses were coded as non-suicide ideation, suicide attempt or deliberate self-harm. Additionally, zip codes were categorized and relabeled as residential region.

Patient names and dates of birth were provided to the medical examiner's (ME) data analyst via encrypted email. The ME's office completed an internal database search to identify cases with a suicide manner of death from March 1, 2015 to March 31, 2020 matching the ED patient dataset. The ME's data analyst sent the researcher an Excel file via email, which contained name, date of birth, gender, date of death, and manner of death for 423 cases. These cases were matched in the ED dataset based on name, date of birth, and gender. The researcher excluded 47 cases with a date of death after March 31, 2020 and 26 cases who expired in the ED or inpatient during their first visit were excluded. Statistical analyses were completed on the remaining 350 cases including calculating length of time in days between ED visit and date of death. Reference visits were identified for cases with multiple ED visits and defined as the visit closest to the date of death.

Figure 3

Identification of ME Matches



Aim 1

To describe biological, psychological, sociocultural and ED care factors among discharged ED patients who subsequently expired due to suicide.

The researcher completed descriptive statistical analyses on the 350 cases including comparing sites for statistically significant differences with *chi*-square, Fisher's exact for small cells, and ANOVA analysis as appropriate. Demographic and reference visit information are shown in Tables 3 and 4. In this sample, mean age at time of ED visit was 47.6 years (SD = 17.2). Majority of cases (73.4%) were male (n = 257), White (66.9%; n = 234), non-Hispanic/non-Latino (82%; n = 287) and speak a primary language of English (97.1%; n = 340). Most cases reported residing in the North/Central region (42.2%; n = 150) followed by East region (40.9%; n = 143), and South region (10.9%; n = 38). There was a close distribution of

payors with 28.6% reporting Medicaid coverage (n = 100), 24.6% reporting private insurance coverage (n = 86), and 23.4% without a report of payor (n = 82). There were statistically significant differences among sites accounting for ethnicity χ^2 (3, N = 335) = 20.3, p< .001; language χ^2 (6, N = 349) = 12.6, p = .019; residential region χ^2 (9, N = 335) = 213, p< .001; and payor χ^2 (12, N = 350) = 20.5, p =.043.

Table 2

Demographic Information of Individuals with Suicide Mortality (n = 350)
**ANOVA, **Chi-Square, ^Fisher's exact*

Demographics						
	Site 1 *n* = 18	Site 2 *n = 34*	Site 3 *n = 163*	Site 4 *n = 135*	All	*p value*
Age at Visit mean (SD)	43 (12.8)	43.6(17.7)	48.2(17.3)	48.4(17.4)	47.6(17.2)	.299*
Gender						.596**
Female	7	10	40	36	(93)26.6%	
Male	11	24	123	99	(257)73.4%	
Race						.520^
AI/AN/NH	0	0	0	2	(2)0.6%	
Asian	0	1	2	10	(13)3.7%	
Black	0	0	9	6	(15)4.3%	
White	12	21	106	95	(234)66.9%	
Other, Multiple	6	11	39	20	(76)21.7%	
Missing	0	1	7	2	(10)2.9%	
Ethnicity						<.001^
Hispanic	4	14	17	13	(48)13.7%	
Non-Hispanic	14	19	137	117	(287)82%	
Missing	0	1	9	5	(15)4.3%	
Language						.019^
English	18	30	160	132	(340)97.1%	
Spanish	0	4	1	1	(6)1.7%	
Other	0	0	2	1	(3)0.9%	
Missing	0	0	0	1	(1)0.3%	
Residential Region						<.001^
North/Central	7	8	36	99	(150)42.8%	
East	2	1	119	21	(143)40.9%	
South	8	21	1	8	(38)10.9%	
Outside County	1	0	2	1	(4)1.1%	
Missing	0	4	5	6	(15)4.3%	
Payor						.043^
Private	7	5	33	41	(86)24.6%	
Medicaid	5	16	46	33	(100)28.6%	
Medicare	0	3	29	24	(56)16.0%	
Other	2	5	44	29	(82)23.4%	
Unknown	4	5	44	29	(82)23.4%	

In this sample, average length of stay was 459 minutes (SD = 535) with a range of 0–3,929 minutes. Cases had three ED visits on average (SD = 5.3) and range of 1–55 visits during the study period with 52% of cases visiting once. The majority of cases (77.7%) had a primary billing diagnosis on their reference visit not involving suicide attempt, suicide ideation, or deliberate self-harm (*n* = 272). For ED disposition, 55.4% (*n* = 194) were discharged home followed by 23.7% inpatient admission (*n* = 83) and 9.4% psychiatric hospital (*n* = 33). Of the 350 cases, 20.9% (*n* = 73) had record of a PET order in the EHR. In this organization, suicide risk is defined as a score of two or above on the RSQ which is comprised of a screening question and four subsequent questions. In this sample, 9.4% (*n* = 33) met the definition of suicide risk, 32.3% (*n* = 113) with a behavioral health complaint, 10.6% (*n* = 37) with an affirmative answer to Question 1, 16.9% (*n* = 59) with an affirmative answer to Question 2. EHR did not capture responses for Questions 3 and 4. For time between ED reference visit and date of death, 6.9% (*n* = 24) were between 0–7 days, 12% (*n* = 42) between 8–30 days; 12% (*n* = 42) between 31–60 days, 36.9% (*n* = 129) between 61–365 days, and 32.3% (*n* = 113) greater than 365 days. There were statistically significant differences among sites accounting for length of stay $F(3,346)=7.6$, $p<.001$; disposition status $\chi^2(9, N = 350) = 20.9$, $p = .008$; PET order $\chi^2(3, N = 350) = 37.9$, $p < .001$, and behavioral health complaint $\chi^2(3, N = 345) = 15.3$, $p = .001$.

Table 3

Reference Visit Information for Individuals with Subsequent Suicide Mortality (n = 350)
**ANOVA, ^Fisher's exact*

	ED Visit (n) %					
	Site 1	Site 2	Site 3	Site 4	All	*p* value
Length of Stay (mean/SD)	307/390	356/319	601/633	333/411	459/535	<.001*
Number of Visits (mean/SD)	1.6/.9	2.5/2.4	3.5/5.6	2.8/5.7	3/5.3	.364*
Diagnosis						.092^
SI, SA or DSH*	1	0	19	10	(30)8.6%	
Non-SI, SA or DSH*	15	31	120	106	(272)77.7%	
Missing	2	3	24	19	(48)13.7%	
Disposition Status						.008^
Home	15	20	91	68	(194)55.4%	
Admitted	0	10	31	42	(83)23.7%	
Psych Hospital	2	0	17	14	(33)9.4%	
Other	1	4	24	11	(33)9.4%	
PET Order						<.001^
Ordered^	2	1	57	13	(73)20.9%	
Suicide Risk	2	1	20	10	(33)9.4%	.263^
Behavior Health Complaint^	3	3	54	53	(113)32.3%	.001^
Question 1^	2	1	22	12	(37)10.6%	.107^
Question 2^	2	1	34	22	(59)16.9%	.170^
Question 3^	0	0	0	0	(0)0%	-
Question 4^	0	0	0	0	(0)0%	-
Time Discharge to Death (days)						0.955^
0-7 days	0	1	14	9	(24)6.9%	
8-30 days	2	2	20	18	(42)12.0%	
31-60 days	2	5	19	16	(42)12.0%	
61-365 days	8	15	61	45	(129)36.9%	
>365 days	6	11	49	47	(113)32.3%	

*SA=suicide attempt, SI =suicide ideation, DSH= deliberate self-harm; ^yes response

Aim 2

To describe the relationships among biological, psychological, sociocultural, and ED care factors among discharged ED patients who subsequently expired due to suicide.

Appropriate bivariate statistical analyses were completed including independent *t*-test, one-way ANOVA, Spearman's correlation, Mann-Whitney, Kruskal-Wallis, *chi*-square, and

Fisher's exact using IBM SPSS Statistical software versions 26 and 27 (see Table 5). In this sample, there were several statistically significant relationships among variables.

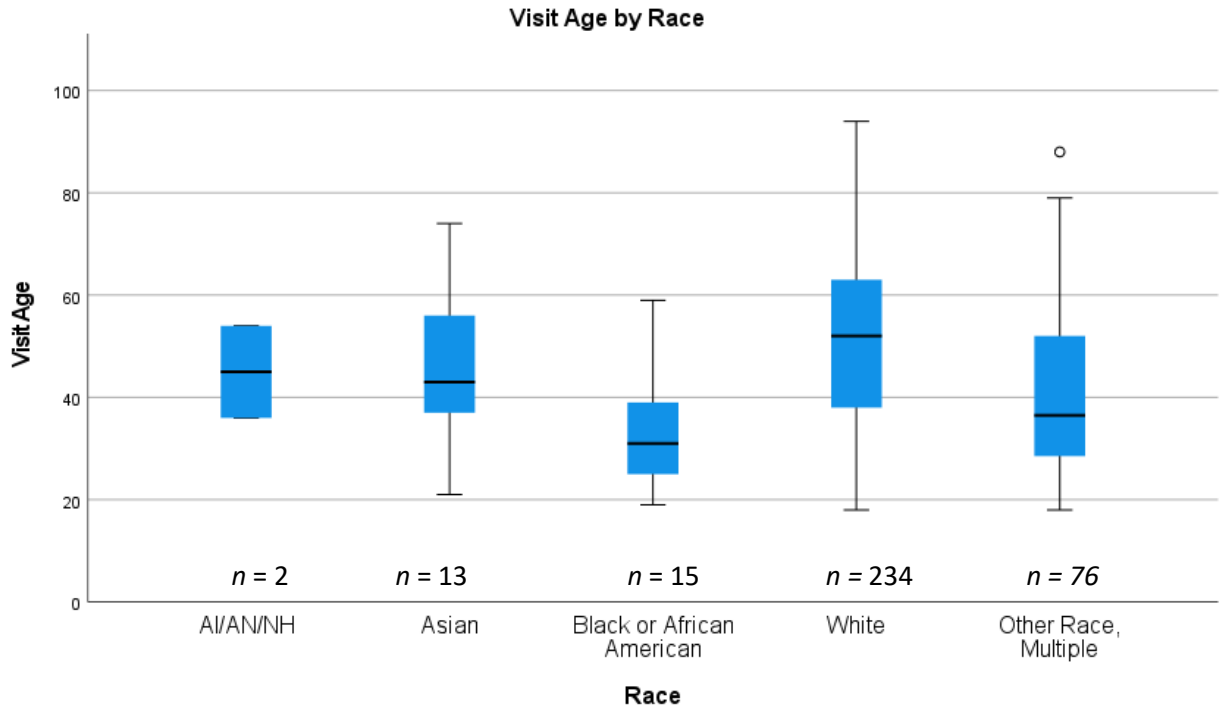
Age

There was a significant difference in age among racial groups; $F(4,335) = 8.4$, $p<.001$. *Post hoc* comparisons using the Tukey honestly significant difference (HSD) test indicated White cases were on average older than all other racial groups; 16 years older than Black/African American cases and 10 years older than Other/Multiple cases (see Graph 1). An independent *t*-test was completed to evaluate the relationship between age and ethnicity and was statistically significant $t(333)=-5.2$, $p <.001$ indicating non-Hispanic/non-Latino (M = 49.6, SD = 16.9) cases were on average 13 years older than Hispanic cases (M = 36, SD = 14.5; see Graph 2). An evaluation of age and language was also statistically significant $F(2,346) = 4.3$, $p = .015$ and a *post hoc* Tukey HSD test indicated cases who spoke a language other than English or Spanish were on average 25 years older than English speaking cases and 35 years older than Spanish speaking cases (see Graph 3). Age and payor had a statistically significant relationship $F(4,345) = 33.2$, $p<.001$ and a *post hoc* Tukey HSD indicated Medicare cases were 17 to 26 years older than cases with private, Medicaid, other, or unknown reported payors. Those with unknown coverage were on average 10 years older than those with Medicaid coverage. Age and ED disposition status also had a statistically significant relationship in this sample; $F(3,349) = 10.4$, $p<.001$and a *post hoc* Tukey HSD test indicated that cases admitted were 11 years older than those discharged home and 14 years older than those admitted to a psychiatric hospital (see Graph 4). An independent *t*-test was completed to assess relationship between age and a PET order and was statistically significant; $t(348) = -3.06$, $p = .002$. Cases without a PET order (M =

49, SD 17.6) were seven years older than those with a PET order (M = 42.2, SD 14.5; see Graph 5).

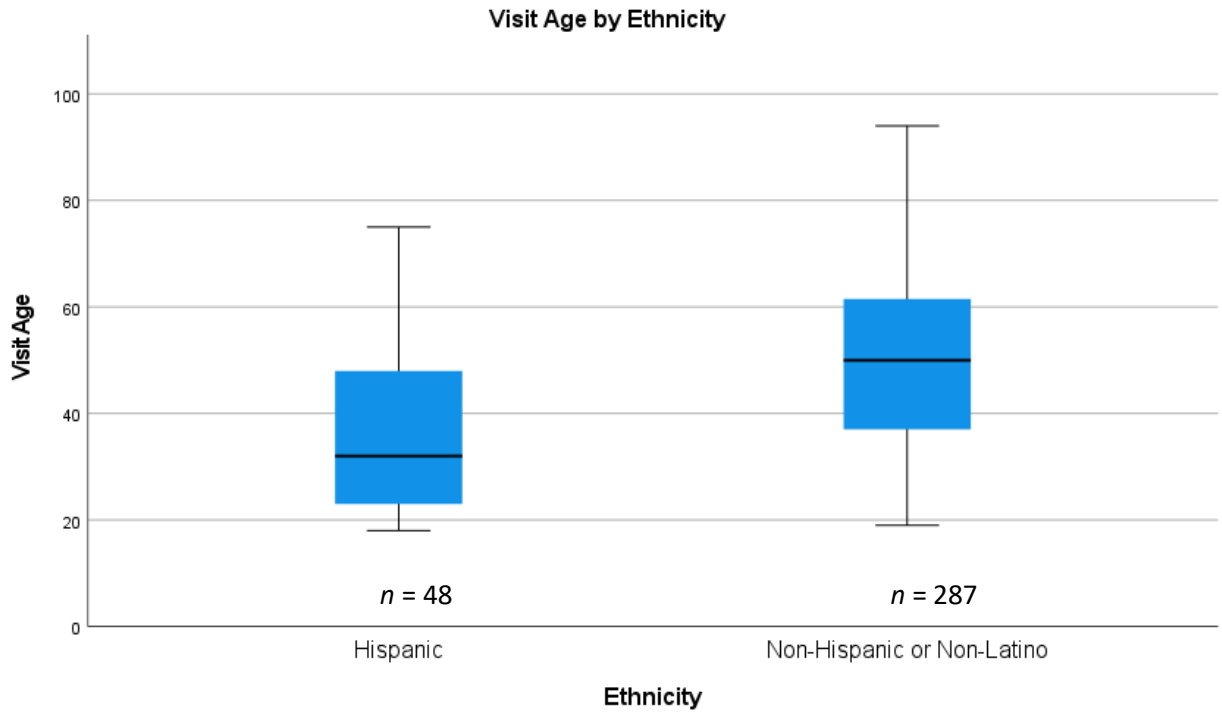
Graph 1

Age at time of ED visit by race (*N = 340)*



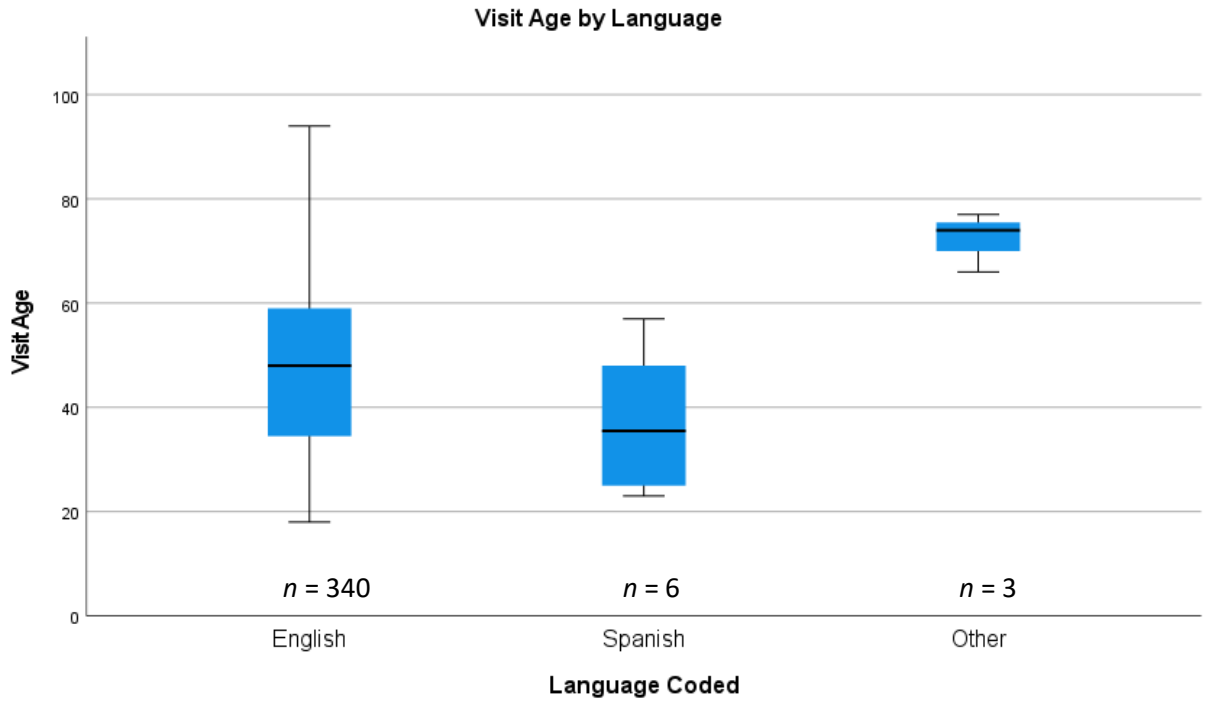
Graph 2

Age at time of ED visit and ethnicity (*N = 335)*



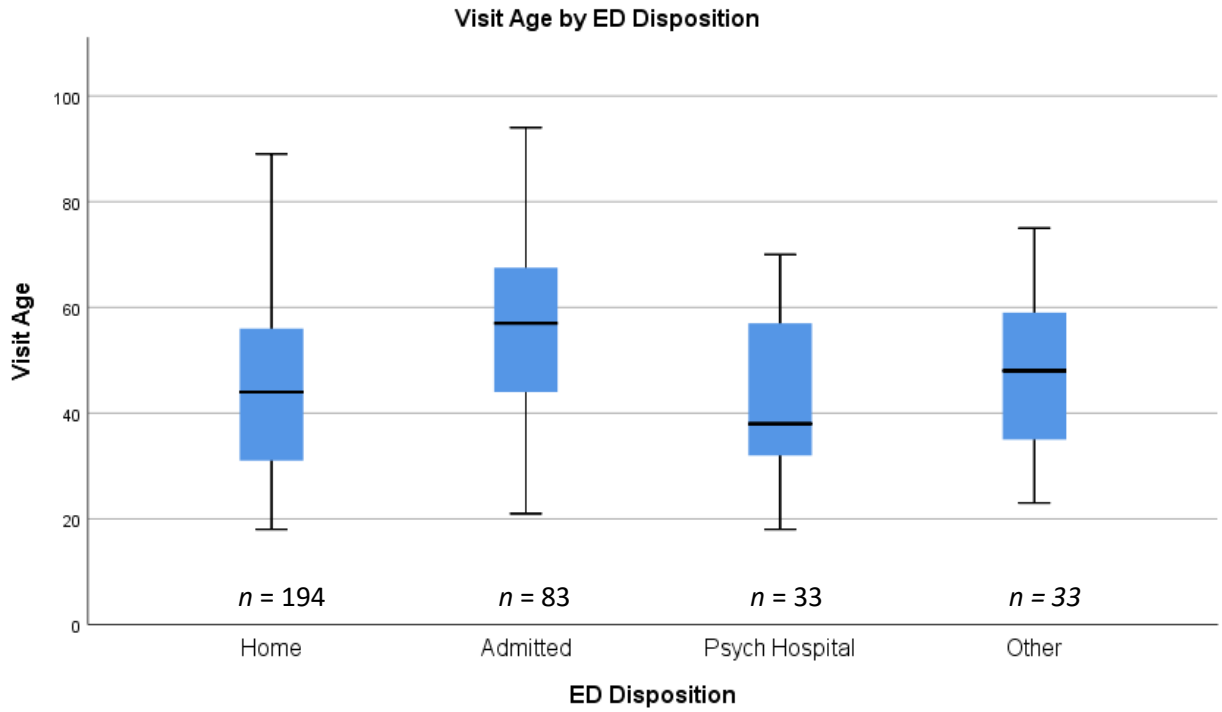
Graph 3

Age at time of ED visit and language (*N = 349)*



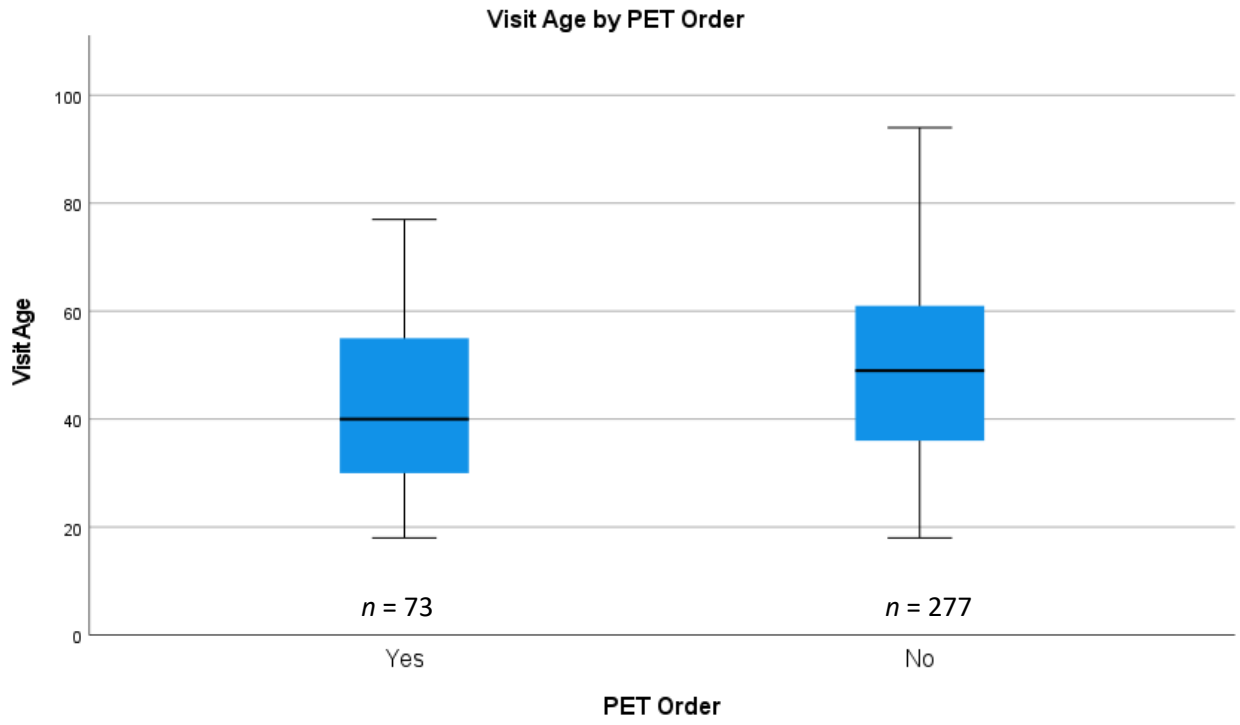
Graph 4

Age at time of ED visit and ED Disposition (*N* = 343)



Graph 5

Age at time of ED visit and PET order (*N* = 350)



Race

The relationship between race and ethnicity was evaluated and was statistically significant in this sample; $\chi^2(4, N = 334) = 105$, $p<.001$ because more Hispanic cases identified as Other race/Multiple than statistically expected. Additionally, associations between race and language was statistically significant $\chi^2(8, N = 340) = 24.9$, $p = .002$ because more Spanish speaking cases identified as Other race/Multiple than statistically expected. Race and residential region were statistically significant $\chi^2(12, N = 326) = 21.3$, $p = .042$ with more Asian cases residing in North/Central region and more Other/Multiple cases in South region. Finally, there was a relationship between race and payor $\chi^2(16, N = 340) = 30.6$, $p = .003$ because more Black/African American or Other Race/Multiple reported Medicaid coverage than Whites. More White than Other Race/Multiple reported Medicare coverage.

Ethnicity

In this sample, there was a statistically significant relationship between ethnicity and language $\chi^2(2, N = 335) = 18.4$, $p<.001$ with fewer non-Hispanics/non-Latinos reporting Spanish as primary language than statistically expected. There was also a relationship between ethnicity and residential region $\chi^2(3,321) = 17.3$, $p<.001$ with fewer Hispanic cases residing in North/Central and East regions and more in South region. Ethnicity and payor were statistically significant $\chi^2(4, N = 335) = 17.8$, $p = .001$ with fewer Hispanics reporting private or Medicare and more reporting Medicaid than statistically expected.

Residential Region

A Kruskal-Wallis test assessed the relationship between residential region and length of stay (LOS) and was statistically significant $\chi^2(3, N = 335) = 12.2$, $p = .007$. Cases residing in North/Central and East regions had longer LOS on average than other areas. There was also a relationship between residential region and presence of a PET order $\chi^2(3,335) = 11.6$, $p = .007$; those residing in the South region were statistically less likely to have a PET order and those residing in the East region were more likely to have a PET order.

Payor

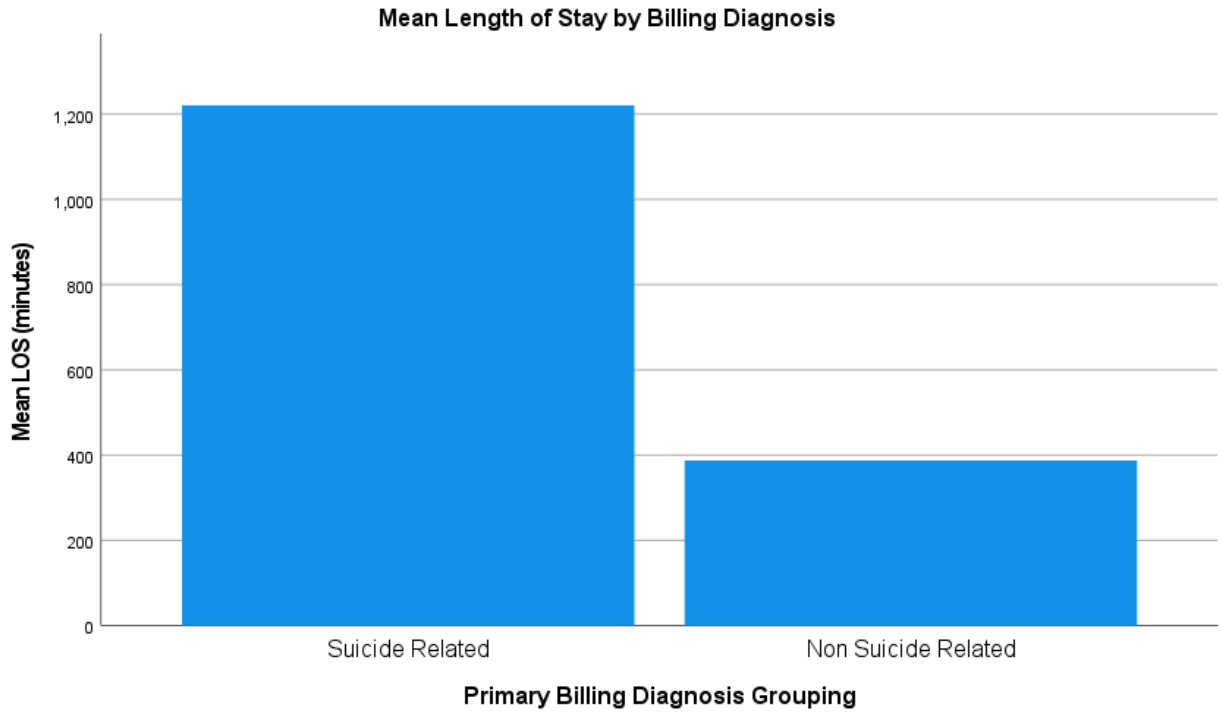
A Fishers *chi*-square analysis was completed to evaluate relationship between payor and disposition status and was statistically significant $\chi^2(12, N = 350) = 22.4$, $p = .028$. More cases with Medicaid were discharged home than expected. For cases admitted, fewer had Medicaid and more reported Medicare than expected. Additionally, more cases with private insurance were admitted to psychiatric hospital than statistically expected.

Length of Stay

A Mann-Whitney U test assessed difference in rank between cases with and without a suicide related billing diagnosis and time in the ED and was statistically significant (U= 1491, N_1 = 30, N_2 = 272, p<.001). Cases with a suicide related billing diagnosis had more than a 13-hour longer length of stay than those cases without (see Graph 6). Using a Krusal-Wallis test, cases admitted to a psychiatric hospital had longest length of stay; over 10 hours longer than those that are discharged home or admitted; $\chi^2(3, N = 350) = 57.6$, p <.001 (see Graph 7). Cases with a PET order had nearly a 12-hour longer length of stay than those without: U = 2470, N_1 = 73, N_2 = 277, p<.001 (see Graph 8). Similarly, cases identified as a suicide risk had over a 12 hour longer length of stay than those without; U = 2,303, N_1 = 33, N_2 = 312, p<.001 (see Graph 9).

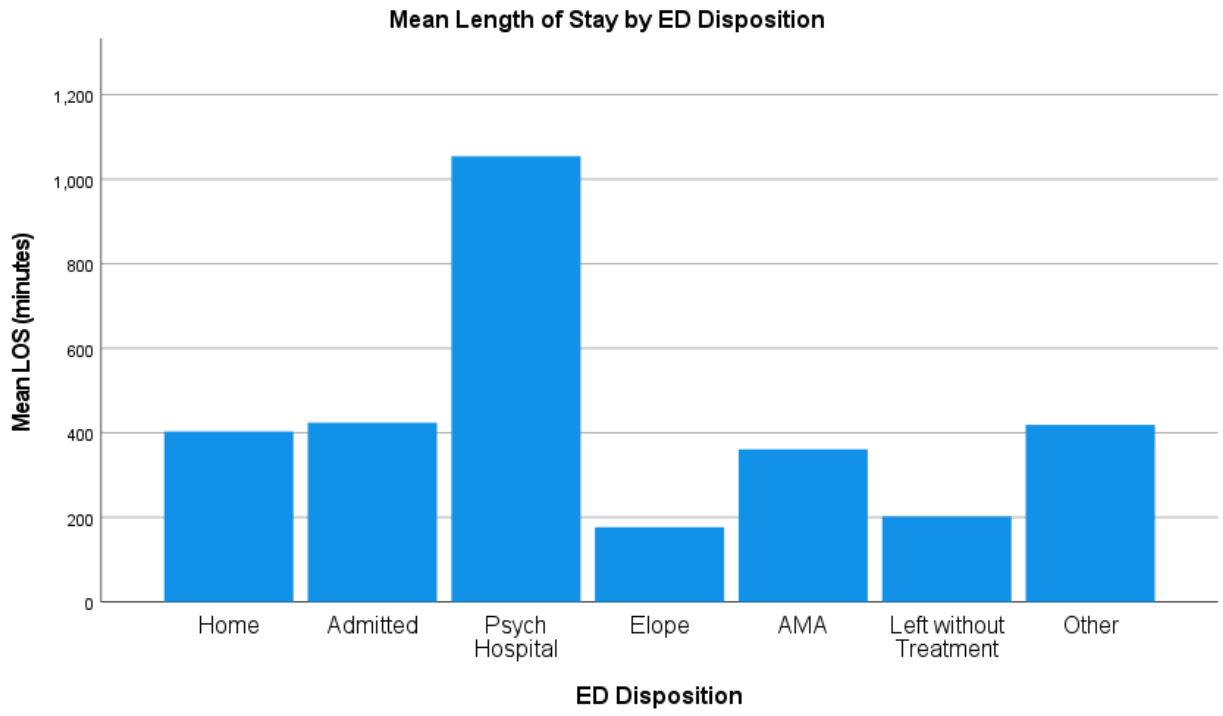
Graph 6

Length of Stay by Primary Billing Diagnosis (N = 302)



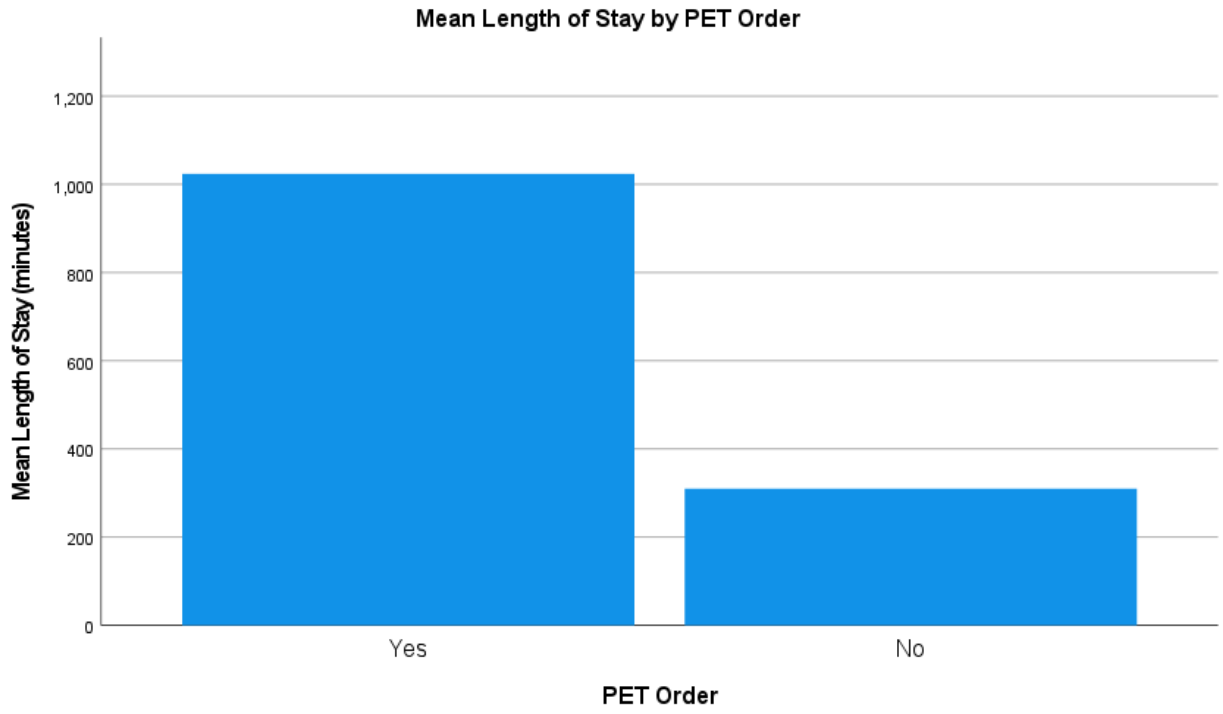
Graph 7

Length of Stay by ED Disposition (*N* = 350)



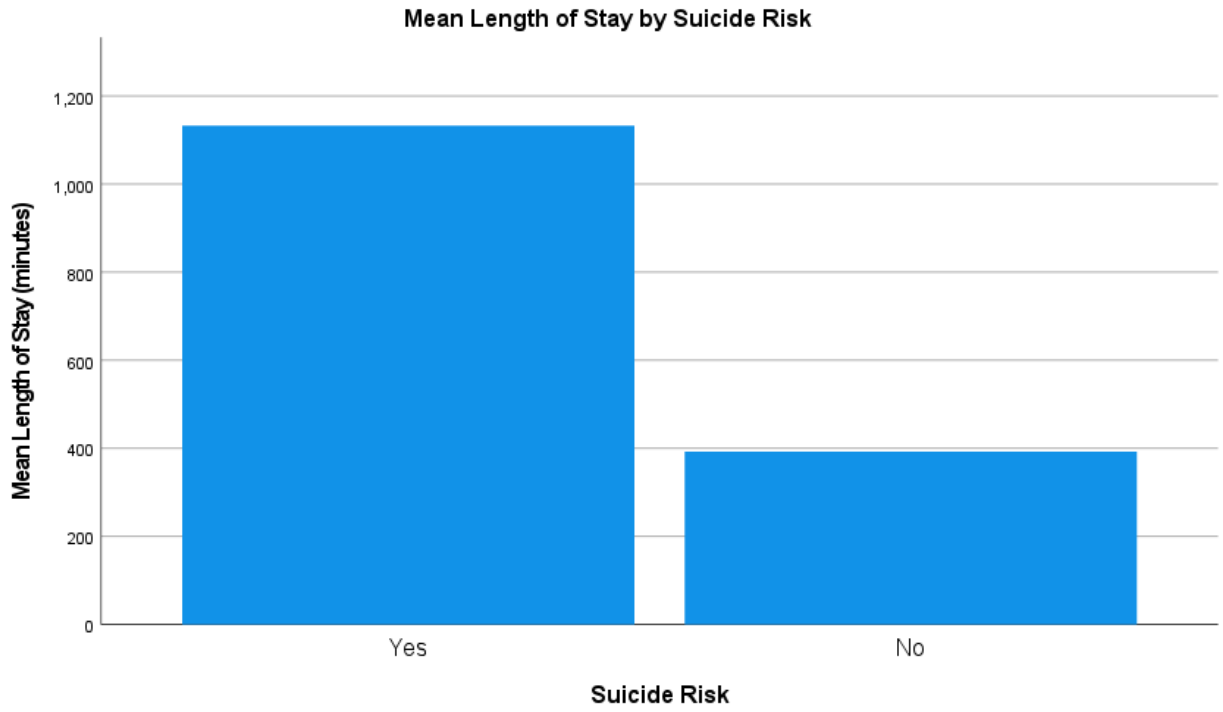
Graph 8

Length of Stay by PET Order (*N* = 350)



Graph 9

Length of Stay by Suicide Risk (*N* = 350)



Diagnosis

Fewer cases with a suicide related diagnosis were discharged home or admitted than statistically expected and more were admitted to a psychiatric hospital; χ^2 (3, *N* = 302) = 19.5, *p*<.001. More cases with a suicide related diagnosis had a PET order than statistically expected; χ^2 (1, *N* = 302) = 67.4, *p*<.001.

PET Order

There was a statistically significant relationship between PET order and suicide risk χ^2 (1, *N* = 345) = 51.5, *p*<.001. More cases who were identified as a suicide risk in the EHR had a PET order than statistically expected.

Suicide Risk

Suicide risk and primary billing diagnosis were evaluated and found to be statistically significant; $\chi^2(1, N = 299) = 100.6$, $p<.001$. More cases who were identified as a suicide risk in the EHR had a suicide related diagnosis than expected.

Table 4

P-values of Bivariate Relationships among Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-	.59	<.001	<.001	.015	.084	<.001	.053	.359	<.001	.002	.396
2. Gender	.59	-	.098	.161	.852	.183	.187	.339	1	.059	.882	.681
3. Race	<.001	.098	-	<.001	.002	.042	.003	.094	.587	.908	.614	.843
4. Ethnicity	<.001	.161	<.001	-	<.001	<.001	.001	.581	.778	.274	.845	.787
5. Language	.015	.852	.002	<.001	-	.070	.484	.542	1	.713	.522	1
6. Residential Region	.084	.183	.042	<.001	.070	-	.130	.007	.950	.195	.007	.790
7. Payor	<.001	.187	.003	.001	.484	.130	-	.601	.366	.028	.261	.451
8. Length of Stay	.053	.339	.094	.581	.542	.007	.601	-	<.001	<.001	<.001	<.001
9. Diagnosis	.359	1	.587	.778	1	.950	.366	<.001	-	<.001	<.001	<.001
10. Disposition Status	<.001	.059	.908	.274	.713	.195	.028	<.001	<.001	-	<.001	<.001
11. PET Order	.002	.882	.614	.845	.522	.007	.261	<.001	<.001	<.001	-	<.001
12. Suicide Risk	.396	.681	.843	.787	1	.790	.451	<.001	<.001	<.001	<.001	-

Aim 3

To determine the odds of suicide death controlling for biological, psychological, sociocultural and ED care factors.

Lack of power and variability among the bivariate relationships precluded use of a multivariate model to control for factors of interest.

Summary

In summary, this chapter contains data management approaches and statistical analysis for this research study. The purpose of this study was to describe relationships among biological, psychological, and sociocultural factors, and ED care among discharged ED patients who were treated in one of four EDs of an integrated healthcare system from March 1, 2015 to March 31, 2019, and describe association of these variables on subsequent suicide mortality. Data were obtained from the healthcare's organizations EHR including name and date of birth for all adult ED patients. These unique identifiers were sent to the medical examiner's office for matching of cases with a suicide manner of death. Less than 1% of discharged adult, ED patients matched between the EHR and medical examiner (N = 350). Reference visit, defined as visit closest to date of death, was identified and used for data analysis.

Multivariate analysis modeling the odds of suicide death controlling for demographic variables was not completed due to insufficient statistical power among the variables of interest.

Chapter 5

The purpose of this study was to determine suicide mortality rate of emergency department (ED) patients and what biological, psychological, and sociocultural factors and ED care are associated with this rate. From March 1, 2015 to March 31, 2019, there were 1,066,750 adults with a documented ED visit at one of four EDs in an integrated healthcare organization in Southern California. From March 1, 2015 to March 31, 2020, there were 350 cases of the 1,066,750 ED patients with a suicide manner of death per the ME. For this research study, incidence of suicide was 33 per 100,000 during the study period, which is double the rate in San Diego (Smith, 2019). Previous research examined suicide rate for those individuals with chief complaints of suicidal ideation or deliberate self-harm compared to a sample ED population (Goldman-Mellor et al., 2019). Other studies have retrospectively examined percentage of suicide cases previously treated in the ED (Baraff et al., 2006; Cruz et al., 2011; Stuck et al., 2017). The researcher was unable to locate prior research examining suicide rates for an adult ED population in an integrated healthcare system for comparison.

Research Conceptual Framework

The research conceptual framework captures relationships among independent variables and their association on the dependent variable of suicide mortality. Consistent with Pender's Model of Health Promotion, there are biological, psychological, and sociocultural factors affecting behavior of health care providers, which subsequently lead to health or, in this study, suicide.

Biological

In this research study, mean age was 47.6 years, which is younger than the 65 and over age group identified as highest risk for suicide (United Health Foundation, 2020). Final billing

ICD 9/10 diagnosis codes served as proxies for both biological and psychological factors. In this study, 77.7% (n = 272) cases had a non-suicide related diagnosis during their reference visit. This is comparable to prior research in which 69% of suicide victims visited the ED for reasons other than suicide and self-harm (Gairin et al., 2003). Most common primary billing categories included injury related diagnoses (14.3%; n = 50); gastrointestinal (GI), genitourinary (GU), or reproductive related diagnoses (12.9%; n = 45); and other diagnoses (12.6%; n = 44). Distribution of these diagnosis categories are contained in Table 7. Clinically, those presenting with injury or GI/GU/reproductive complaints may be at a higher risk and therefore could benefit from additional suicide risk screening. The 'other' category contained 44 non-categorizable diagnoses reinforcing the need for universal screening and assessment regardless of chief complaint and diagnosis.

Table 5

ICD-9/10 Final Billing Diagnosis (*N* = 350)

Diagnosis	Count	Percentage
Injury Related	50	14.3%
GI/GU/Reproductive Related	45	12.9%
Other	44	12.6%
Suicide Related	30	8.6%
Mental Illness Related	29	8.3%
Alcohol/Drug/Medication Related	28	8.0%
Pain Related	24	6.9%
Brain Related	17	4.9%
Cardiac Related	17	4.9%
Infection Related	10	2.9%
Respiratory Related	8	2.3%
Missing Data	48	13.7%

Psychological

The healthcare organization where this study was conducted collects gender as a binary category. In this study, the gender distribution was 73.4% male (*n* = 257) and 26.6% female (*n* = 93), which is consistent with prior research indicating males have a higher rate of suicide compared to women (Goldman-Mellor et al., 2019; Hedegaard et al., 2018; Smith et al., 2019; Stuck et al., 2017; United Health Foundation, 2020).

Another variable for psychological factors was suicide risk per the documented Risk of Suicide Questionnaire (RSQ) assessment. In clinical practice and in this study, suicide risk is defined as a positive RSQ screen to the question, “Does the patient have a psychological,

behavioral, substance abuse complaint or a history?" and a score of two or greater on the subsequent four questions. In this study, 9.4% (*n* = 33) met the definition of suicide risk during their reference ED visit, which is less than 32.3% (*n* = 113) with a documented positive screening for a behavioral health complaint. For Question 1, "Are you here because you tried to hurt yourself?", 10.6% (*n* = 37) of cases had documented "yes" responses and for Question 2, "In the past week, have you been having thoughts about killing yourself?", 16.9% (*n* = 59) of cases had documented "yes" responses. In this sample, EHR did not capture responses for Question 3, "Have you ever tried to hurt yourself in the past?", or Question 4, "Has something very stressful happened to you in the past few weeks? (A situation that has been very hard to handle?)". Low positive screening is comparable to prior research in which screening did not capture patients potentially at risk for suicide (Stuck et al., 2017) with as low as 3% of patients with suicidal ideation detected with screening (Boudreaux et al., 2015). There may have been a technical glitch in EHR preventing capturing documented responses to Questions 3 and 4. Additionally, the RSQ's psychometric properties could have influenced instrument ability to reliability generate valid data thus not accurately detecting individuals at risk for suicide. Furthermore, if the organization assessed suicide risk per the instrument's design (1 affirmative response), nearly double the number of cases, 17.7% (n = 62), would have met the definition for suicide risk.

Sociocultural

Similar to national trends and prior research, the majority of cases in this study were English speaking, White, non-Hispanics/non-Latinos (Curtain & Warner, 2016; Goldman-Mellor et al., 2019; Smith et al., 2019; Stuck et al., 2017; United Health Foundation, 2020). Racial distribution in this study varied from distribution in the county in which Whites comprised 66.9% of suicides but represent 46.2% of the population in San Diego (County of San Diego,

2020). Additionally, 13.7% of the suicides in this study were of Hispanic ethnicity compared to 33.4% of the San Diego population (County of San Diego, 2020), indicating the White, non-Hispanic/non-Latino population remains at high risk for suicide regardless of region distribution.

For residential region, the East region in this study contained 40.9% (*n* = 143) of suicide cases. The East region contains much of the county's rural areas and is the location for Site 3, which had the highest proportion of cases (46.6%). Despite high rates of suicide in this region, it contains only 15% of the county's residents (Ray, 2015). These results are consistent with prior research in which rural residents have a higher suicide rate (Hedegaard et al., 2018) and East county reporting the highest suicide rate in San Diego (Smith, 2019).

In this study, payor for cases was closely split among Private (24.6%), Medicaid (28.6%), and Unknown (23.4%). The distribution of payors for the healthcare organization is not available for comparison. Cases at Sites 1 and 4 were more likely have private insurance, cases at Site 2 were more likely to have Medicaid coverage, and cases at Site 3 were more likely to have unknown coverage. If payor were to be a proxy for socioeconomic status, these outcomes would be similar to the county's distribution of wealth.

Emergency Department Care

Although ED care is complex, for purposes of this research study, evaluation of care provided in the ED was limited to the presence of a psychiatric evaluation (PET) order, number of ED visits, disposition status, and length of stay during reference visit. In this sample, 20.9% (*n* = 73) had a PET order in the EHR on their reference visit, which is less than the number of cases that met criteria for suicide risk (*n* = 33). This infers provider assessment and clinical judgment may detect individuals more at risk than screening or they may have had a PET order to address mental health concerns beyond suicide. It was not possible to extract from EHR status of these

orders; specifically, if they were completed, cancelled, or conducted via telepsychiatry. There was a statistically significant difference among sites: 11% of cases at Site 1 had a PET order, 2% at Site 2, 35% at Site 3, and 9% at Site 4. This variance may be a function of varying provider practices, site processes, and resources, and not necessarily reflective of patient differences. For example, Sites 3 and 4 have close proximity to psychiatric hospitals affiliated with the healthcare organization. Additionally, there was a staggered timeline for adoptions to use of telepsychiatry with Site 3 transitioning after other sites. Variation in PET orders is also reflected in residential region; those living in the South region, near Site 2, were statistically less likely to have a PET order.

In this sample, cases had an average of three ED visits in the study period with a range of 1–55 visits. Two cases with the most ED visits, 55 and 50, died within two weeks (two and 10 days respectively) of their reference visit. This is similar to the study by Cruz et al. (2011) in which 12% of suicide victims were 'frequent attenders' (more than three visits) and this group were 2.5 times more likely to die by suicide within a month of ED discharge (OR 2.57, 95% CI 1.15-5.74).

More than half of cases during their reference visit were discharged home and a quarter admitted at the presenting hospital. Fewer than 10% were admitted to a psychiatric hospital during their reference visit. Further research on suicide rates based on disposition status could help in guiding clinical decision-making and advocating for additional resources such as inpatient psychiatric hospitals and intensive outpatient programs.

The average length of stay (LOS) was 459 minutes with Site 3 nearly having double the mean of other sites. Cases meeting criteria of suicide risk and who had a PET order or were discharged to a psychiatric hospital had the longest LOS, which is consistent with prior research

(Nicks & Manthey, 2012; Stephens et al., 2014). Many EDs struggle with throughput and the strain caring for those in mental health crises can have on the organization.

In this study, 6.9% of cases died by suicide within seven days of ED discharge. Of the 24 cases with suicide within seven days; five were on same day of discharge and three of those cases were ED super-users with 17, 24, and 55 visits during the study period. Furthermore, 30% of cases had suicide mortality within 60 days of their reference visit and 67.8% within one year, which is consistent with prior research (Ahmedani et al., 2014; Baraff et al., 2006; Gairin et al., 2003; Goldman-Mellor et al., 2019; Luoma et al., 2002; Miller et al., 2017; Olfson et al., 2018; Stuck et al., 2017). Timeliness of suicide mortality post ED discharge also emphasizes the importance of discharge planning, including referral to mental health resources for patients identified for risk of suicide.

For this research study, White, non-Hispanic/non-Latino, English speaking males in their late 40s with three or more ED visits, without a suicide related primary diagnosis and residence in the East County, were most at risk for suicide in 60 days. Based on this research, reliance on a suicide risk screening such as the RSQ may not be beneficial for identifying those at risk due to lack of capturing the complete RSQ assessment in the EHR. Those with suicide related diagnosis were less likely to be discharged home, more likely to be assessed as a suicide risk, and more likely to have a PET order indicated that once identified, suicide prevention treatment is provided. Another encouraging result from this study is ED care including presence of a PET order, disposition status, primary diagnosis, or suicide screening did not vary based on ethnicity, race, gender, or language, indicating parity in care across groups. Payor type did influence disposition status in this sample because older cases, who were more likely to have Medicare and physiological complaints, were more likely to be admitted. Furthermore, more cases with

Medicaid were discharged home than was to be statistically expected and more cases with private insurance were admitted to a psychiatric hospital than expected, indicating payor may influence discharge disposition. In regard to age, cases discharged home or transferred to a psychiatric hospital were younger, and older cases were less likely to have a PET order. This may be from the influence of payor and disposition status as a PET order in the ED can be deferred for admitted patients and completed when inpatient and no longer in the ED.

Implications

Practice

Given the higher incidence of suicide among ED patients, universal screening is an appropriate clinical practice. However, it is not without challenges in the ED including competing priorities, lack of standard practices for screening even in the presence of a standardized tool, and stigma surrounding mental health and suicide which may prevent patient disclosure. One recommendation to address these practice barriers includes leveraging EHR as another available tool for screening. It has been well documented in the literature, including this study, that certain individuals may be at a higher risk for suicide. Predictive analytics using EHR could automatically identify patients matching the profile as someone who may be of higher risk for suicide regardless of chief complaint. Another recommendation is to implement self-screening to overcome barriers with self-reporting. It is also important to standardize practices of screening. For example, based on this researcher's clinical experience, implementation of the RSQ varies across sites, providers, and patients. Some providers may verbalize the screening for a behavioral health complaint while others infer based on chief complaint or medical history. Standardization of implementation of the RSQ regardless of chief complaint, mode of arrival, and provider would increase instruments capability to generate reliably valid data. Additionally,

providers should maintain the same level of reverence when screening for suicide as is practiced with domestic violence screening. The ED is a fast-paced environment in which speed and efficiency is valued but so is accuracy and patient care. Providers need to feel empowered to conduct thorough suicide screening as a mechanism to detect those at risk, not to satisfy regulatory requirements. Finally, for those missed in screening, there should be additional avenues for reporting suicide ideation during their ED visit. Literature and resources should be available to patients during their healthcare interactions. Perhaps the placement of resources and hotline information in lobbies, bathrooms, and discharge instructions would increase referrals to community resources similarly to domestic violence practices.

Another practice recommendation is to correct downstream issues such as placement and lack of resources so providers are not hesitant to screen. Both in research and anecdotally, providers report uncertainty and inability to manage effectively patients in the ED with suicide ideation. Additionally, barriers to more thorough psychiatric evaluations should be removed, including additional PET providers and more widespread use of telepsychiatry. These mental health experts are key in assessing, creating safe discharge plans, and arranging post discharge follow-ups, but requesting a PET can significantly extend a patient's LOS, which may be a deterrent to utilization. EDs are key conduits to resources for those with mental health needs but they require adequate resources and support to be able to do that.

Provider Education

Care disparities exist for patients with suicidal ideation who seek care in EDs compared to patients with somatic complaints. They often do not receive same levels of attention from staff, resources, or compassion as those with physical presenting symptoms (Betz et al., 2013). This can be extremely detrimental to those with thoughts of self-harm because it could worsen

their perception of themselves, negatively affect care (Larkin et al., 2009), and deter them from seeking assistance in the ED for psychiatric complaints in the future (Harris et al., 2016). Often, disparity in care is the result of competing priories in the ED and lack of adequate staff training and education for psychiatric treatment (Betz et al., 2013; Larkin et al., 2009; Oordt et al., 2009). Combined with stigma and biases to which healthcare providers are not immune (Betz et al., 2013), the result is a perceived poor attitude and apathy toward patients with suicidal ideation (Harris et al., 2016). This weakness can be addressed by providing additional education to providers, including nurses, who work in EDs, including identification of those in mental health crisis and principles of therapeutic communication. Often in the EDs, focus is on care of physical illnesses and injuries, but EDs are also mental health providers in many communities. Additionally, implicit bias training may be beneficial to ED providers in identifying their own biases influencing how they interact with patients with mental health complaints. It is imperative that all patients feel safe and cared for while in the ED and providers are given the education, tools and resources to do so.

Research

Much research surrounding suicide has focused on suicide autopsies to determine which factors and variables increase population groups risk for suicide. However, research on identification of those at risk and related appropriate interventions to mitigate suicide is lacking. Additional research is recommended on development of or refinement of suicide screening instruments that can reliably generate valid data. Many of the short version tools, in practice, lack psychometric properties to identify reliably patients at risk. A challenge for EDs is balancing reliability and validity of an instrument and its ability to be completed quickly with a wide range of ages and cultural backgrounds. Additionally, given the episodic nature of ED care,

it can be difficult for providers to assess patient outcomes such as morality post discharge. Additional studies such as this should be conducted in collaboration with local healthcare and public health systems to capture true suicide mortality rate, patient variables, and treatments contributive or protective of suicide mortality.

Limitations

There are several study limitations in addition to those identified *a priori*. In this study, billing diagnosis was limited to only the primary one documented. Therefore, suicide related billing diagnoses documented as secondary or tertiary were not captured and therefore may be underrepresented in this study. Additionally, ED providers are not trained mental health practitioners and may not have the ability to diagnosis mental health conditions in the ED especially given the episodic nature of ED care. In this healthcare organization, gender is a binary construct and therefore this study was not able to assess the suicide risk for other vulnerable groups based on gender status. There are also known concerns about psychometrics of the instrument and its inability to generate valid data, especially given the systematic lack of capture in the EHR responses to Questions 3 and 4.

Summary

The purpose of this study was to determine the suicide mortality rate of ED patients and what biological, psychological, and sociocultural factors and ED care are associated with this rate. From March 1, 2015 to March 31, 2019, there were 1,066,750 adults with a documented ED visit at one of the 4 EDs in an integrated healthcare organization in Southern California. From March 1, 2015 to March 31, 2020, there were 350 cases of the 1,066,750 ED patients with a suicide manner of death per the ME. For this research study, incidence of suicide was 33 per 100,000. For this research study, White, non-Hispanic/non-Latino, English speaking males in

their late 40s with three or more ED visits, without a suicide related primary diagnosis, and residence in the East county were most at risk for suicide within 60 days. Based on this research, reliance on a suicide risk screening such as the RSQ may not be beneficial for identifying those at risk due to lack of capturing complete RSQ assessment in the EHR.

Final Conclusions

Suicide is a devastating event, which can be prevented with timely interventions and appropriate allocation of resources. Many suicide victims have healthcare interactions prior to their death, posing healthcare providers as pivotal resources in identification, intervention, and prevention of suicide. This study confirms previous research indicating ED patients are at a higher risk of suicide than the general population. However, due to competing priorities, lack of resources, and stigma, ED patients may not be identified as at risk for suicide and provided with timely interventions to prevent their death. This study builds upon prior research that certain demographic groups are more susceptible to suicide. Additionally, it highlights challenges with universal screening including how instruments easily incorporated into practice may not be able to produce reliably valid data due to variations in provider practices and technology barriers. It is imperative that ED providers are trained in therapeutic communication to aid in screening, EDs are provided with adequate resources including safe disposition options for patients without adequate insurance coverage, and that healthcare organizations leverage existing systems and structures such as the EHR to help identify those at risk and prevent further loss of life.

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Appendix A
University of San Diego Committee on Protection of Human Subjects

Aug 12, 2020 11:53 AM PDT

Bri DuBose

Hahn School of Nursing & Health Science

Re: Initial - IRB-2020-512 Suicide Mortality of Emergency Department Patients

Dear Dr. Bri DuBose:

University of San Diego Human Subjects Review Board has rendered the decision below for Suicide Mortality of Emergency Department Patients.

Decision: No Human Subjects Research

Findings: None

Research Notes:

Internal Notes:

Note: We send IRB correspondence regarding student research to the faculty advisor, who bears the ultimate responsibility for the conduct of the research. We request that the faculty advisor share this correspondence with the student researcher.

The next deadline for submitting project proposals to the Provost's Office for full review is N/A. You may submit a project proposal for expedited or exempt review at any time.

Appendix B
Suicide Risk Assessment and Risk of Suicide Questionnaire