THE CATHOLIC UNIVERSITY OF AMERICA

Suicide Risk in Children and Adolescents in a Pediatric Emergency Department:
Effects of Race, Income, Gender, and Age

A DISSERTATION

Submitted to the Faculty of the

Department of Psychology

School of Arts and Sciences

Of The Catholic University of America

In Partial Fulfillment of the Requirements

For the Degree

Doctor of Philosophy

©

Copyright

All Rights Reserved

By

Elizabeth Day Ballard

Washington, D.C.

2011

Suicide Risk in Children and Adolescents in a Pediatric Emergency Department: Effects of Race, Income, Gender, and Age

Elizabeth D. Ballard, PhD

David A. Jobes, PhD, Director

Suicide in adolescents is a leading cause of death and a public health concern. Suicide screening in the pediatric emergency department (ED) has emerged as a promising method of suicide prevention, as this setting treats many at-risk children and adolescents and has potential resources to manage positive screens. While suicide screening tools exist, they have not been validated on diverse samples, particularly in minority and lower-income populations. Additionally, clinical and demographic suicide risk factors that are specific to diverse, lower-income ED populations have not been identified.

For the purposes of this study, a retrospective medical record analysis was conducted to evaluate the utility of a suicide screening tool in a predominately African American, low-income population. Specifically, responses to the Risk of Suicide Questionnaire (RSQ), a suicide screening tool developed to evaluate patients presenting to the pediatric ED for psychiatric reasons, were evaluated against other demographic, clinical and administrative variables. The study also aimed to identify clinical and demographic factors related to suicide risk to facilitate the development of targeted interventions.

From a logistic regression analysis of 493 patient visits to an urban pediatric ED over a nine-month period, a positive score on the RSQ was associated with increased odds of psychiatric hospitalization. RSQ score was not associated with foster care or insurance status. Female gender was associated with suicide risk; however, given a depression

diagnosis, there was no difference in suicide risk between the genders. There was no

association between a history of violent behavior and suicide risk. While there was no direct

relationship between abuse and suicide risk, using multiple regression, there was an

interaction between age and abuse history with older adolescents demonstrating a stronger

relationship between abuse and suicide risk.

Overall, a suicide screening tool can predict hospitalization and may identify

children and adolescents in most need of psychiatric resources in a pediatric ED. Potential

targets for intervention include suicidal behavior, depression diagnosis and trauma,

particularly for older adolescents. Implications for assessment and intervention in pediatric

EDs are discussed.

This dissertation by Elizabeth Day Ballard fulfills the dissertation requirement for the doctoral degree in clinical psychology approved by David A. Jobes, PhD, as Director, and by Lisa Horowitz, PhD, MPH, and Barry M. Wagner, PhD as Readers.

_____

David A. Jobes, PhD, Director

_____

Barry M. Wagner, PhD, Reader

_____

Lisa Horowitz, MPH, PhD, Reader

Dedication

This dissertation is dedicated to Charles Myers and Ellis and Katherine Ballard

and to all those who pursue a life worth living.

TABLE OF CONTENTS

ILLUSTRATIONS

Tables

Figures

Acknowledgements

    This research and my progress in this program would not have been possible without my mentor and research advisor, David Jobes. His passion and commitment to suicide prevention continues to inspire me every day and he has been an invaluable resource in research, clinical work and professional development. Similarly, this work would not have been possible without the humor and critical eye of Lisa Horowitz. She has informed how I think about research design and instrument development; my aims statements will never be the same. The calm influence of Barry Wagner was also essential for providing an outsider's viewpoint of this research and has helped shape this work to make it more accessible, logical and readable.

    I also could not have completed this dissertation without the work and insight of my NIH colleagues. Maryland Pao has always asked the tough questions and is a model of a clinician and scientist. Abigail Bosk helped me focus my research questions and read multiple early drafts of my proposal. Sarah Westen and Erica Ludi cheerfully helped me with coding data, and the members of Office of the Clinical Director family have always supported me while also pushing me to produce the best possible scientific research. Stephen Teach at Children's National Medical Center also provided access to the medical record data.

    My meetings with classmates Corine Bell and Catherine Rathman were crucial for brainstorming, formulating ideas and keeping me on track. Additionally, my good friend, Kristen Talcott, provided valuable formatting wizardry. My parents, Meredith and Ted, and brothers, Ellis and Charlie, and friends have also been supportive cheerleaders throughout the process.

Last, but certainly not least, my soon-to-be husband, Brian, has been a rock of stability and humor throughout graduate school. His unfailing optimism has carried me through many late nights and moments of self-doubt. I am excited to start married life with this process behind us.

Introduction

Suicide in children and adolescents is a public health threat. It is the fourth leading cause of death in 10-14 year olds and the third leading cause of death in 15-19 year olds (National Center for Injury Prevention and Control, 2010). Each year, over 1,700 individuals under the age of 20 die by suicide (National Center for Injury Prevention and Control, 2010). After a decline in suicide rates in the 1990s, rates of adolescent deaths by suicide spiked in 2004, with an increase in deaths that could not be attributed to a one-year anomaly (Bridge, Greenhouse, Weldon, Campo, & Kelleher, 2008). Each child and adolescent suicide is devastating to parents, friends, schools and entire communities (Cerel, Jordan, & Duberstein, 2008).

Non-lethal suicidal thoughts and behavior are also concerns in child and adolescent populations and have negative effects on psychiatric outcome. From the 2009 Youth Risk Behavior Survey (YRBS), it is estimated that 13.8 % of high school students have thought about suicide, 10.9% have made a suicide plan, 6.3% have attempted suicide in the last year and 1.9% have received medical treatment for an attempt (Eaton, et al., 2010). One-third of adolescents who die by suicide have made a previous attempt (Shaffer, et al., 1996) and adolescent suicide attempts are predictive of later death by suicide, even when controlling for psychopathology (Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Pfeffer, et al., 1993). Adolescents with suicidal ideation are three times more likely to die by suicide when compared with their adolescent counterparts without such a history (Pfeffer, et al., 1993). In a seven-year longitudinal study of 1,265 New Zealand adolescents, adolescent suicidal

1

behavior was also associated with later psychiatric morbidity, including future suicidal behavior and major depression (Fergusson, Horwood, Ridder, & Beautrais, 2005).

Additionally, suicidal children and adolescents are less likely to ask for help and are not often connected with mental health resources. In an analysis of the 2000 National Household Survey of Drug Abuse, only 45% of adolescents who reported a suicide attempt in the last 12 months had received mental health services over the same time period (Wu, Katic, Liu, Fan, & Fuller, 2010). From a survey of high schoolers, students who reported suicidal ideation were less likely to ask for help with mental health concerns than students who did not report suicidal ideation (Husky, McGuire, Flynn, Chrostowski, & Olfson, 2009). Even when suicide attempters do present to health care settings, such as the emergency department (ED), they are often not connected with mental health resources (Suominen, Isometsa, Martunnen, Ostamo, & Lonnqvist, 2004) and when they are, they rarely follow-up with psychiatric referrals (Grupp-Phelan, Delgado, & Kelleher, 2007). Therefore, suicidal children and adolescents are a high-risk group who are not currently identified by the healthcare system.

Suicide Screening, False Positives and False Negatives

Systematic suicide screening has been proposed as a way to connect at-risk youth with appropriate resources (Horowitz, Ballard, & Pao, 2009; Pena & Caine, 2006). In such efforts, each youth in a target population is administered a screening tool to assess suicide risk. Those youth who are considered to "screen positive," that is ascertained to be at a level of risk for suicide that warrants further assessment and intervention, are then connected with

resources for further evaluation. The concern with any screening tool is to separate the "true positives" from the "true negatives," that is the ability of the screening tool to differentiate the patients who have the condition of interest from the individuals who do not. In suicide screening efforts, a tool could identify suicidal ideation or behavior as the condition of interest, as it is known that these symptoms increase the risk for future suicide attempts and dying by suicide (Brent, et al., 1999; Pfeffer, et al., 1993).

In implementing a screening tool, there are also concerns about false positives. False positives are those individuals who screen positive on a tool, but do not have the condition of interest. In the case of a suicide screening tool, this would involve identification of children and adolescents who are not at increased risk for suicide. If a screening tool has a high false positive rate, then many more children may receive additional assessment and intervention than is necessary, which may overload some health care systems. The resources of the setting in which the screening takes place will also impact how a high false-positive rate is viewed: is this a setting in which there are available mental health resources for comprehensive follow-up and intervention or would the over-identification of at-risk youth become taxing to clinical staff?

False negatives are another concern in developing a screening program. For false negatives, individuals with the condition of interest are not "caught" by the screening tool. For individuals with suicide thoughts and behaviors, there can be dire consequences for false negatives. In implementing screening programs, oftentimes the consequences of false negatives must be weighed against false positives. It can be argued that in the case of suicide

risk, in which there may be serious and lethal consequences if symptoms are missed, the risk of a false negative outweighs the clinical burden of false positives. On the other hand, in certain settings the burden of a glut of false positives could outweigh the effects of periodic false negatives. Such concerns have implications for which tools are utilized and in which settings screening is implemented.

Emergency Department as a Potential Location for Suicide Screening

The emergency department (ED) is a potential setting to screen for suicide risk. Increasing numbers of children are utilizing the ED for mental health care (Grupp-Phelan, Harman, & Kelleher, 2007) and the most common presenting complaint for these children is suicidal ideation and behavior (Grupp-Phelan, et al., 2009). Analyses of ED use show that adolescents and young adults who present to the ED for suicide attempts, self harm or suicidal ideation are at greater risk to die by suicide than adolescents or young adults who present to the ED for other reasons (Crandall, Fullerton-Gleason, Aguero, & LaValley, 2006), a trend also seen in adults (Gairin, House, & Owens, 2003). Clinicians in the ED see many children who go on to attempt or die by suicide, which suggests that screening efforts could identify many at-risk youth.

However, suicide attempters who come to the ED are often not connected to mental health care (Suominen, et al., 2004). In a sample of adults and adolescents in England, only 59% of patients presenting after an incident of self-harm received a psychological assessment (Bennewith, Peters, Hawton, House, & Gunnell, 2005). Across four pediatric ED's, 83-94% of patients who present to an ED for psychiatric reasons received a mental

health evaluation (Grupp-Phelan, et al., 2009), however many adolescents who are referred to psychiatric appointments do not complete suggested follow-up (Grupp-Phelan, Delgado, et al., 2007). Therefore, better assessment of at-risk youth in the ED is needed as well as connection of these youth with mental health resources.

With the appropriate assessments and resources, the ED would be a feasible location for suicide screening. Screening for other public health conditions such as domestic violence, and HIV status is normative in pediatric EDs (Minniear, et al., 2009; Newton, et al., 2010); suicide screening could model these other screening efforts. Additionally, these settings are usually connected to mental health resources such as inpatient psychiatric units and outpatient psychiatric clinics, therefore, ED staff may be particularly equipped to refer patients who screen positive for suicide risk with mental health care. Furthermore, many children and adolescents receive their primary healthcare through the ED and may not be "caught" by other screening efforts, such as in locations such as primary care clinics (Horowitz, et al., 2009).

Research on suicide screening in the ED has increased, especially over the past decade (Asarnow, et al., 2008; Grupp-Phelan, Wade, et al., 2007; King, O'Mara, Hayward, & Cunningham, 2009), although screening has not been systematically implemented. This research has suggested that such screening in the ED is acceptable to patients and their parents and would not significantly affect patient length of stay (Horowitz, et al., 2010). Qualitative analysis has also demonstrated that the majority of patients screened for suicide risk supported similar screening for all patients in the pediatric ED (Ballard, in press).

Interviews with caregivers of adolescents entering the ED for psychiatric reasons have found that these individuals consider the ED to be a place to obtain guidance, help for their child as well as assessment, diagnosis and referral to other mental health resources in the community (Cloutier, et al., 2010). Screening for suicide risk in the ED may facilitate each of these concerns, particularly the quick identification of youth in most need of resources. Further research is needed to determine the most appropriate tools for ED populations.

Evaluation of an ED Suicide Screening Tool

In 2001, Horowitz el al., developed a brief suicide screening tool, the Risk of Suicide Questionnaire (RSQ), for use with patients entering the ED for psychiatric reasons (Horowitz, et al., 2001). This tool was developed to assess suicide risk upon triage to the ED, which refers to the brief assessment that a non-psychiatric nurse conducts when a patient enters the ED to ensure that the patient is seen by the appropriate clinical team and doctors. The RSQ was validated against the Suicide Ideation Questionnaire (Reynolds, 1987) and the resulting four-item questions are as follows:

- Are you here today because you tried to hurt yourself?
- In the past week, have you been having thoughts about killing yourself?
- Have you ever tried to hurt yourself in the past (other than this time)?
- Has something very stressful happened to you in the past few weeks (a situation very hard to handle)?

In this study, the RSQ received a sensitivity of .98, meaning that the RSQ identified 98% of those patients who exceeded a clinical cut-off on the SIQ (Horowitz, et al., 2001).

Nurses also appreciated having a screening tool to use in their triage assessment (O'Neill, Horowitz, Smith, Levin, & Klavon, 2001). This screening tool has been implemented in pediatric EDs around the country. However, the RSQ has not been evaluated for utility and feasibility in an ED population with a higher percentage of minority, low-income and foster-care patients. The original validation sample was 49% Caucasian, 26% African American and 15% Latino/Hispanic. The income level of that sample of patient families as well as the percentage of patients in the foster care system is unknown.

When implementing suicide screening tools, the population of interest is a critical concern. As Pena and Caine point out (2006), determining the validity of a screening tool in different patient populations is essential, as differing levels of risk in the underlying patient population can affect true and false positive rates. A higher false positive rate may be manageable in settings in which the underlying frequency of the condition is low; but burdensome in settings in which the prevalence of the condition is high. Therefore, it is important to understand whether established screening tools are still appropriate and valid in diverse settings by race and ethnicity, income or foster care. For example, Kaslow's group at Emory University has focused on prevention of suicide in low-income, African American women who have experienced interpersonal violence, and have used knowledge of population-specific prevalence, risk factors and protective factors to develop tailored, culturally appropriate ED screening tools and interventions (Houry, Kemball, Click, & Kaslow, 2007; Kaslow, et al., 2010). The current project can be considered a first step in

identifying valid screening measures, in the development of similar assessments and interventions for lower-income, predominately African American children and adolescents.

An investigation of the utility of the RSQ with an eye towards income and foster care status will be helpful in the development of more effective suicide assessment in EDs with diverse populations. In particular, the relationship between responses to RSQ items and health services variables, such as psychiatric hospitalization, warrants further investigation. A previous study of involuntary psychiatric hostpialization in an adult community mental health center found that risk of harm to self or others was not a significant predictor of hospitalization (Engleman, Jobes, Berman, & Langbein, 1998). If there is a significant relationship between RSQ score and psychiatric hospitalization, clinicians and administrators could then identify those patients at increased risk of hospitalization earlier in the ED visit. With this knowledge, clinical practice guidelines could be developed that could initiate a search for inpatient beds or consultation with psychiatric staff, in order to more effectively manage the flow of patients. Such data would inform the further implementation of suicide screening tools and possibly shed light on more efficient and effective management of suicidal patients in pediatric EDs.

A review of the literature on suicide in African American adolescents, individuals in the foster care system as well as the relationship between income and suicidality will be detailed in the following sections.

Race and Suicide Risk.

Until recently, much of the adolescent suicide literature has focused on Caucasian adolescents (Joe, Canetto, & Romer, 2008). As a result, there has been little data on suicidal thoughts and behaviors in children and adolescents from diverse populations, particularly African American adolescents (Joe, Baser, Neighbors, Caldwell, & Jackson, 2009). In focus groups with parents from urban, suburban and rural adolescents, many parents commented that adolescent suicide was a national concern, but not a problem in their particular community (Schwartz, Pyle, Dowd, & Sheehan, 2010). During these focus groups, one African American parent from an urban neighborhood implied that African American adolescents do not report suicidal behavior at the same rates as white adolescents. Other focus groups have suggested that African American adolescents do not see suicide as common in their community (Molock, et al., 2007).

While historically it has been found that minority adolescents attempt suicide at a lower rate than their white counterparts, recent increases in minority adolescent suicidal behavior have been reported (Borowsky, Ireland, & Resnick, 2001; Joe, et al., 2009). According to the YRBS, there are no differences between African American and Caucasian adolescents in rates of seriously considering suicide or making a plan for suicide, however, African American adolescents are significantly more likely to have attempted suicide in the last year (7.9%) when compared to Caucasian adolescents (5%) (Eaton, et al., 2010). Interestingly, there was no difference between those groups in the percentage of suicide attempts which required medical treatment, which could relate to the lethality of the suicide

attempt or represent a sign of reluctance to seek treatment on the part of the African American adolescents.

Cultural and contextual factors can impact when and how ethnic minority adolescents decide whether to seek assistance for a mental health concern and which services they attend (Cauce, et al., 2002). In a sample of adolescents who had contemplated or attempted suicide in the last year, African American adolescents were 65% as likely to seek mental health services when compared to Caucasian adolescents, while Hispanic adolescents were 55% as likely to seek services (Freedenthal, 2007). These analyses controlled for severity of symptoms as well as access to mental health services. Another study of adolescent suicide attempters showed that nonwhite adolescents were less likely to have had contact with mental health services when controlling for psychiatric symptoms, family income and community factors (Wu, et al., 2010). Therefore, minority adolescents may not present for mental health services with the same frequency as Caucasian adolescents. As a result, suicide screening efforts in locations such as the ED, which can potentially connect patients with mental health resources, may be particularly needed in these populations.

Furthermore, the risk factors for suicide in African American adolescent populations may differ from risk factors in other ethnicities, which may impact the utility of a suicide screening tool. For example, psychiatric diagnosis is an established risk factor for death by suicide across all age groups (Bridge, Goldstein, & Brent, 2006). In contrast, in a review of National Survey on American Life, it was found that around half of African American

adolescents who attempted suicide did not meet criteria for a Diagnostic Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) psychiatric diagnosis at the time of the attempt (Joe, et al., 2009).   In a direct comparison of Caucasian and African American adolescents hospitalized for suicide ideation or attempts (Merchant, Kramer, Joe, Venkataraman, & King, 2009), Caucasian inpatients reported higher levels of hopelessness and suicidal ideation than African American inpatients. Additionally, suicidal ideation was predictive of multiple suicide attempts in Caucasian inpatients, but not in African American inpatients. Higher interpersonal orientation was also associated with multiple suicide attempts in African American, but not Caucasian, inpatients. The authors suggest that effective interventions for suicide risk in African American adolescents focus on social factors, such as interpersonal orientation and social comparison, in addition to clinical factors related to depression and suicidal ideation. Furthermore, culturally-specific protective factors, such as communalism and family cohesion have been shown to be associated with lower rates of suicidal behaviors in African American college populations, (Harris & Molock, 2000). Other culturally-specific factors, such as religious coping behavior and external locus of control have been explored as possible risk and protective factors for suicidal behavior in African American adolescents (Spann, Molock, Barksdale, Matlin, & Puri, 2006). Because suicide risk factors may differ from Caucasian and African American adolescents, revalidation of a suicide screening instrument will be beneficial to ensure that the screening questions are appropriate to this particular population.

Income and Foster Care.

Poverty is a variable that has shown mixed associations with suicide risk in adolescents. In a Canadian study, it was shown that living in a poorer neighborhood was associated with suicidal ideation and behavior, when controlling for socioeconomic status, maternal depression as well as internalizing and externalizing symptoms (Dupere, Leventhal, & Lacourse, 2009). Living in a disadvantaged neighborhood increased the odds of suicidal ideation by two and suicide attempts by four. The authors posit that these neighborhoods provide an environment with more potential for stressful life events, which interacts with underlying biological vulnerabilities to increase risk for suicidal behavior. In another study of suicide related deaths, deaths by suicide were associated with lower income for Caucasians, but not African Americans, across all age groups (Purselle, Heninger, Hanzlick, & Garlow, 2009). For African American adolescents in particular, increased income was associated with an increased rate of deaths by suicide. In a study of adolescent suicide attempters using geocoding, adolescents who lived in neighborhoods with weak social connectedness had higher rates of hopelessness, when controlling for socioeconomic status and depression (Perez-Smith, Spirito, & Boergers, 2002). Therefore, the relationship between income, race and suicide risk is not clear and warrants further exploration.

Additionally, recent research suggests that being in foster care may also increase the risk of suicidal thoughts and behaviors. Adolescents in the foster care system are four times as likely to have attempted suicide in the last 12 months than adolescents not in the foster care system (Pilowsky & Wu, 2006). Former child welfare clients are four to five times

more likely to have been hospitalized for a suicide attempt (Vinnerljung, Hjern, & Lindblad, 2006). Studies have also shown that not living with a biological parent is a risk factor for suicide in adolescents (Nrugham, Larsson, & Sund, 2008a). Furthermore, individuals who are part of the foster care system are often not included in larger suicide screening studies, as it is difficult to determine legal guardianship to consent to participation in research (Horowitz, et al., 2010). Since the literature on foster care and suicide is so sparse, an investigation of a sample with a large percentage of foster care patients will be helpful in elucidating this relationship.

From this review, it appears that lower income and being in foster care may be associated with different rates of suicidal thoughts and behaviors. An examination of the RSQ in an ED sample with a higher percentage of low-income and foster-care patients is important for the implementation of the suicide screening tool. It is possible that these factors could affect the utility of the RSQ, as a population with a high level of low-income and foster care patients may have higher rates of suicidal thoughts and behaviors than other ED populations, which may impact the rate of false positives and false negatives. Additionally, these factors may also influence healthcare outcomes; for example, someone with fewer economic resources may not be able to pay for a psychiatric hospitalization, or someone in foster care may be more likely to be hospitalized than someone who has a stable family home environment. Finally, this investigation may be useful in better understanding suicide risk in these underserved groups.

Potential Clinical Factors for Intervention

While the the relationship of the RSQ to psychiatric hospitalization is useful for implementation of the measure, an understanding of which psychiatric diagnoses and symptoms are associated with suicide risk could inform clinical and systems procedures. Knowing whether a particular diagnosis or clinical factor is associated with suicide risk can impact clinical interviewing and decision making; for example, a clinician may be hesitant to discharge a suicidal client if she knows that the client's history of abuse puts her at increased risk for suicidal behavior. Additionally, from a systems perspective, understanding the relationship between diagnosis and suicide risk may have implications for later suicide screening efforts; as another example, perhaps only a segment of the ED population, such as those patients who have depressive symptoms, require an in-depth screening for suicide risk.

Furthermore, establishing a validated suicide screening tool is not an end in and of itself. Once a patient is determined to be at risk for suicide, follow-up is needed to connect the patient with appropriate mental health resources. Therefore, determination of a suitable intervention is the next step in an effective suicide screening protocol (Horowitz, et al., 2009; Pena & Caine, 2006). There are several ED interventions for suicidal adolescents in the current research literature, which focus on many different factors, such as problem-solving strategies (Spirito, Boergers, Donaldson, Bishop, & Lewander, 2002), family factors (Huey, et al., 2004; Rotheram-Borus, Piacentini, Cantwell, Belin, & Song, 2000) and safety planning (J. Evans, Evans, Morgan, Hayward, & Gunnell, 2005). The efficacy of

these interventions is also influenced by demographic factors; a study of multisystemic

therapy demonstrated differential effects by ethnicity, age and gender (Huey, et al., 2004)

and studies of relationship-focused interventions in psychiatric inpatient populations have

shown gender effects (King, et al., 2006). Understanding how demographic and clinical

factors interact in an ED sample may set the groundwork for later interventions that

specifically target the factors that drive the suicidal behavior. As previously stated, specific

interventions for lower-income, abused African American women have been developed

which have shown efficacy in reducing suicidal ideation in response to interpersonal

violence (Kaslow, et al., 2010). Such interventions were developed with knowledge about

the specific risk factors, mediators and moderators in this particular population. A similar

approach can be taken with lower income, predominately African American pediatric ED

samples in order to develop the most effective ED interventions.

The following review details the recent literature on the relationship between suicide

and demographic factors, such as gender and age, as well as clinical variables, such as

depression, aggressive behavior and abuse history. When possible, research on suicide risk

in African American adolescents is highlighted.

Gender, Depression and Aggressive Behavior.

Clinical variables such as depression and aggression have emerged as risk factors for

adolescent suicidal behavior. Depression is a well-established risk factor for suicidal

thoughts and behavior across all age groups (Fergusson, Woodward, & Horwood, 2000) and

is thought to lead to suicidal behavior through low-self-esteem, negative affect, social

withdrawal and hopelessness about the future (Bridge, et al., 2006). Studies have also found

symptoms of depression including feelings of worthlessness, thoughts of death,

hopelessness, decreased concentration and insomnia to be associated with adolescent suicide

attempts (Nrugham, Larsson, & Sund, 2008b). In addition to depression, models of child

and adolescent suicidal behavior also include the influence of aggression (Bridge, et al.,

2006) and anger (Daniel, Goldston, Erkanli, Franklin, & Mayfield, 2009). In a

psychological autopsy study, depression, substance abuse and disruptive disorders were

associated with death by suicide in adolescents (Renaud, Berlim, McGirr, Tousignant, &

Turecki, 2008). Aggressive behavior in 4th-6th grade was also associated with later

suicidal behavior in a study of African American children (Ialongo, et al., 2004). In the

pediatric ED, the most common psychiatric presenting complaints after suicidality are

aggression/agitation and then depression/anxiety (Grupp-Phelan, et al., 2009), making these

factors crucial to understanding the ED patient population.

Gender is an important moderating factor in the development of suicidal behavior. It

is known that girls attempt suicide more often, but that boys are more likely to die by suicide

(Brent, et al., 1999; Bridge, et al., 2006; Fergusson, et al., 2000)). In the 2009 Youth Risk

Behavior Survey, 13.2% of high school girls compared to 8.6% of high school boys made a

plan for suicide and 8.1% of girls compared to 4.6% of boys had attempted suicide in the

last year (Eaton, et al., 2010). In contrast, in 2007, there were 1,352 deaths by suicide in

males and 313 deaths in females ages 19 years and younger (National Center for Injury

Prevention and Control, 2010). Male adolescents tend to use more lethal means than female

adolescents, which increases their risk of dying by suicide (Wagner, 2009). Researchers have posited that suicide attempts are seen as more "feminine" and dying by suicide is considered more "masculine" by adolescents (Canetto, 1997).

Gender, perhaps as a result of these biases, can also affect help-seeking behavior. In a study of 17,193 high school students from the Adolescent Health Survey who had a mental health concern, those who believed they needed professional help were more likely to be female and have a history of abuse (Saunders, Resnick, Hoberman, & Blum, 1994). Gender was a significant predictor of help seeking behavior in a sample of Australian adolescents, when controlling for psychological distress (Rickwood & Braithwaite, 1994). A study of British young adults in distress found that women were more likely to seek mental health assistance than men and that men had a higher threshold for seeking treatment than women (Biddle, Gunnell, Sharp, & Donovan, 2004). Therefore, gender is associated with whether adolescents seek psychological treatment; since boys do not present for mental health treatment at the rate of girls, suicide screening may be particularly important to identify these at-risk boys.

Furthermore, there may be gender differences in the clinical presentation of suicide risk. In an Australian sample, it was found that higher rates of suicidal ideation in females were partially explained by higher rates of depression in girls (Allison, Roeger, Martin, & Keeves, 2001). In a psychological autopsy study of young adults who died by suicide, suicidality was associated with aggression in men, but with depression and post-traumatic stress disorder in women (Prigerson & Slimack, 1999). Gender has also been shown to

moderate the relationship between trait anger and suicidal behavior. In one longitudinal study of adolescent psychiatric inpatients, trait anger and propensity to express anger outwardly was associated with later suicide attempts in males, independent of depression and substance use disorders (Daniel, et al., 2009). The authors suggest that this kind of anger expression may be activating to males, leading them to consider violence as a solution to their frustration. In contrast, low trait anger and a propensity to direct anger inward was associated with suicide attempts in females, which the authors posit may relate to behavioral inhibition associated with depression. In an analysis of the YRBS data, carrying a weapon was associated with increased rates of suicide attempts in both girls and boys, while fighting was associated with suicide attempts in girls only (Epstein & Spirito, 2010). Investigation of the relationship between gender, depression and aggression in the development of suicidal thoughts and behaviors will help clinicians more readily identify these at-risk youth.

Recent research has also looked into gender differences in suicide risk in African American adolescent samples. In a diverse sample of youth from an underserved area, African American boys were at most risk for self-injurious behavior, although this analysis did not contain data on suicidal thoughts or behavior (Latzman, et al., 2010). Figure 1 contains figures from the article by Lambert et al., which depicts the relationship between community violence, depression, aggression and suicidal thoughts and behavior in a sample of African American adolescents. The relationship between depression, aggression and suicidality differs by gender in this model. In girls, there was a significant relationship between depression and suicidal thoughts, but no relationship between aggression and

suicide attempts. In boys, there was a significant relationship between depression and suicidal ideation as well as a relationship between aggression and suicide attempts (Lambert, Copeland-Linder, & Ialongo, 2008).   In contrast, in another study of inner city adolescents, female aggressive behavior as well as depression and substance abuse was associated with later suicidal thoughts and behavior, while only depression and substance use was associated with suicidality in males (O'Donnell, Stueve, & Wilson-Simmons, 2005). These discrepancies suggest the need for further research in this area, as understanding the relationship between depression, aggression and gender will be useful in the development of targeted interventions. In particular, if there are different clinical factors associated with suicide risk in the different genders, it is possible that gender-specific interventions could be developed.
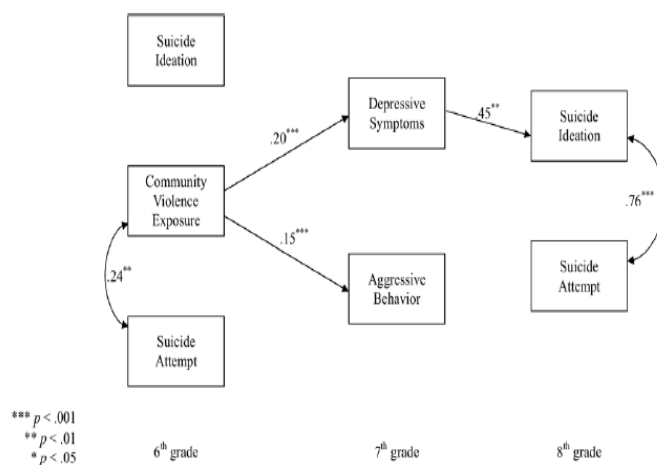
Figure 2. Path analysis for indirect associations between sixth grade community violence exposure and eighth grade suicide ideation and attempt for females.
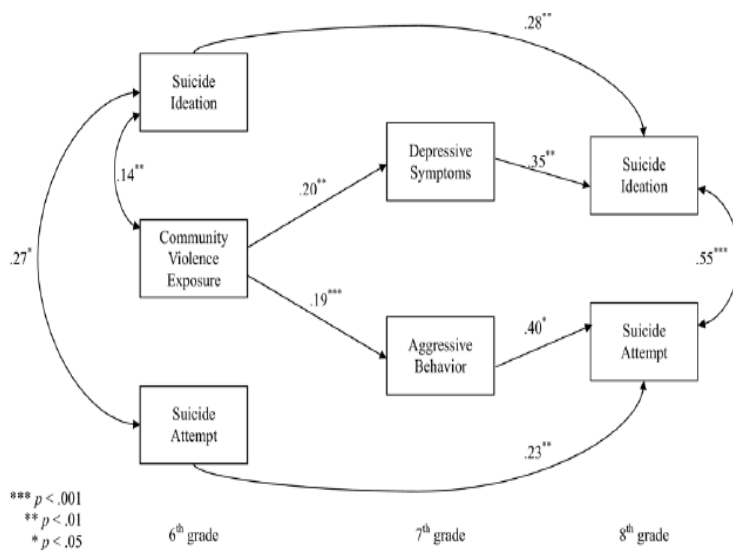
ath analysis for indirect associations between sixth grade community violence exposure and eighth grade suicide ideation and attempt for males.

Figure 1. Lambert model of African American Adolescent Suicidal Behavior

Abuse History and Age.

Negative life events such as abuse or neglect are additional risk factors for suicidal behavior and are unfortunately common in ED populations. In a longitudinal study of sexually abused children in Australia (ages 4 to 15 years), it was found that sexual abuse was related to death by suicide, suicidal thoughts and suicidal behavior at 7 and 9 year follow-up (Plunkett, et al., 2001). In another study, 1280 substance dependent adults were assessed about childhood trauma and subsequent suicidal behavior. Childhood trauma predicted the number of suicide attempts as well as younger age of onset of suicidal behavior (Roy, 2004). In an Australian study of medical records, survivors of childhood sexual abuse were more likely to die by suicide as well as by accidental fatal overdose then individuals who did not experience sexual abuse (Cutajar, et al., 2010). A systematic review of the relationship between abuse during childhood and adolescence and suicidal thoughts found a direct relationship between both physical and sexual abuse and later suicidality (E. Evans, Hawton, & Rodham, 2005). In particular, the relationship between sexual abuse and suicidality was found to be more profound in boys and the relationship was stronger with more severe forms of abuse. Therefore, while abuse is a risk factor for suicidal behavior, the relationship may also interact with demographic characteristics.

One important demographic factor that may impact the assessment of suicidality is age. Death by suicide is rarely reported in children under the age of 12 years, although some researchers suggest that childhood suicide attempts are mislabeled as accidental (Tishler, Reiss, & Rhodes, 2007). The literature on childhood suicidality is remarkably sparse and

resources on suicide risk in minority children are even less well-developed (Wyman, et al.,

2009). Clinicians often have difficulty with assessing suicide risk in children, as

particularly for younger children, suicidal intent does not necessarily correlate with the

lethality of the method of a suicide attempt or plan (Bridge, et al., 2006). However, when

prospectively studied, it is known that children do experience suicidal ideation: in a sample

of urban 6-9 year olds with increased teacher reported aggression and disruptive behavior,

8.5% reported suicidal ideation (Wyman, et al., 2009).

  Since the literature on childhood suicide is so sparse, the suicide risk factors for

children are not as clearly defined as they are for adolescents. As a result, it is possible that

factors such as an abuse history may be particularly important in assessing a child for

suicide risk. From past case studies, suicide under the age of 12 years is associated with

familial factors such as abuse and neglect, however this report was published 30 years ago

and warrants updating (Paulson, Stone, & Sposto, 1978). More recent investigations have

also discussed the influence of parental factors on childhood suicidality (Pfeffer, 2001). It is

possible that younger children who are abused are at increased risk for suicidal thoughts and

behaviors, since they have less cognitive capacity to understand what is happening to them

and how to manage their emotions. It is already known that familial cohesion and support

are important protective variables for suicidality in African American adolescents (Harris &

Molock, 2000). Family factors such as a history of abuse and neglect may have an even

greater impact on suicidal behavior for young children who are more dependent on adults

for their physical and emotional needs. Developmental models of suicide risk (Bridge, et al.,

2006) have implicated abuse, as well as factors such as depression and aggression in the development of adolescent suicidal behavior. However, the influence of abuse on the development of suicidal behaviors in prepubescent children is not clearly delineated in this model or any current model of suicidal behavior.

Clinicians in the ED assess many children who have experienced abuse, as they are involved in many cases of patients entering or involved with the foster care system. Understanding suicide risk as it relates to abuse would be useful in the development of comprehensive assessments, particularly if younger children are found to be at higher risk. Additionally, the understanding of abuse and suicide risk has implications for further ED interventions. Much of the current ED interventions focus on facilitating family communication and cohesion (Rotheram-Borus, Piacentini, Miller, Graae, & Castro-Blanco, 1994), which may not be appropriate in cases where abuse and trauma may be driving the suicidality. Exploring abuse, age and their interaction in the prediction of suicidal thoughts and behavior will be helpful in determining age and history specific ED interventions.

Purpose of the Present Study

The purpose of the proposed study was to evaluate the utility of a suicide screening measure in a lower-income, predominantly African American pediatric ED patient population through an investigation of medical records. In particular, the ability of the suicide screening tool to predict psychiatric hospitalization was evaluated. The study also aimed to examine the relationship between documented history of violence, depression and

suicide risk, stratified by gender. Lastly, the study aimed to describe the effect of age on the relationship between suicide risk and documented history of abuse.

Hypotheses and Predictions

Hypothesis 1: Responses to a suicide screening tool will be predictive of psychiatric hospitalization in a predominantly African American population of patients presenting to an urban pediatric ED.

Prediction 1: Positive score on the RSQ will be positively associated with psychiatric hospitalization; this effect will be moderated by such variables as foster care and public insurance status, with patients in foster care and those with public insurance more likely to be hospitalized.

Hypothesis 2: There will be a significant relationship between gender and presentation of suicide risk, replicating the findings of earlier studies of African American adolescents (Lambert et al., 2008).

Prediction 2: Female patients with a depression diagnosis will have a higher risk of screening positive on the RSQ than non depressed females.

 Prediction 3: Male patients with a past documented history of aggressive behavior will be at higher risk of screening positive on the RSQ than non aggressive males.

Hypothesis 3: There will be a significant relationship between abuse and suicide risk, which will be moderated by age.

Prediction 4: There will be a significant relationship between documented history of abuse and suicide risk, as measured by the RSQ; this relationship will be moderated by

age with younger patients having a stronger relationship between abuse history and

suicide risk.

Methods

Study Overview

This was a secondary analysis of de-identified ED data. The researcher obtained retrospective data from individual medical records examining the Risk of Suicide Questionnaire (RSQ) responses, as well as data on clinical and health services variables, through Logicare, a tracking system used in the Children's National Medical Center (CNMC) ED.

Participant Population

The RSQ was implemented in the CNMC ED (a children's hospital in Washington, DC) for nine months. Data for this study were drawn from visits of District of Columbia residents to the CNMC ED for psychiatric reasons from September 1, 2007- May 17, 2008, with an age range of 0 to 21 years. This study period was chosen as this was the length of time that the RSQ was routinely administered at triage, up until May 17, 2008, when the ED changed to a paperless system. Research has shown that children are more likely to present to the ED for mental health reasons during the school year (Goldstein, Silverman, Phillips, & Lichenstein, 2005), so these patients were a representative sample of yearly visits to the CNMC ED for psychiatric reasons. The age range was chosen as this is the age range of patients seen in this ED. The Logicare system can be searched for ED presenting complaint and this search was limited to all individuals with psychiatric presenting complaints. The

study population was restricted to residents of the District of Columbia in order to gain a

homogeneous sample of all patients entering the emergency department. Individuals who

travel into the District of Columbia seeking mental health treatment may have a myriad of

motivations for entering CNMC, making them different from DC resident visits. No

patients were excluded on the basis of gender, minority status or insurance type.

Measures and Variables

The *Risk of Suicide Questionnaire (RSQ)* is a psychometrically validated four-item

suicide screening tool (Horowitz, et al., 2001) administered by nurses at triage to the ED. A

"yes" response to any of the four questions is considered to be a positive screen. This tool

was validated on 144 children entering an urban pediatric teaching hospital for psychiatric

reasons (Horowitz, et al., 2001). The tool was validated using a "gold standard" assessment

for suicidal ideation, the Suicidal Ideation Questionnaire (SIQ) (Reynolds, 1987), a 30-item

suicide assessment for patients in 10th grade and above and the SIQ-Jr, a 15-item suicide

assessment for those patients in seventh through ninth grade. The criterion standard for the

SIQ was a cut-off score of 41 for the SIQ and 31 for the SIQ-JR.

In the 2001 RSQ validation study, Horowitz et al. obtained a sensitivity of .98, a

specificity of .37, positive predictive value of .55, a negative predictive value of .97 and a c-

statistic of .87 (Horowitz, et al., 2001). Positive predictive value is a statistic that signifies

the probability that the patient has the condition of interest given a positive test result.

Negative predictive value is the probability that the patient does not have the condition of

interest given a negative test result. Therefore, the RSQ has a high negative predictive

value, meaning that the screening tool will identify most of the patients at increased risk for suicidal ideation, but a lower positive predictive value, meaning that more patients will be identified than actually have the condition. A c-statistic is a measure of concordance that evaluates the ability of a model to discriminate between patients who have the condition of interest versus those who do not. A c-statistic of .5 means that the model has no predictive value. As the statistic nears 1.0, there is increased ability to discriminate between patients with and without the condition of interest. In this initial study, the RSQ would have only "missed" one patient who screened positive on the SIQ.

The *CNMC Medical Record* was queried using Logicare to determine age, gender, presenting complaint, disposition, diagnosis, insurance type, zip code and length of stay. Insurance type was considered a proxy for income. The results from this query were downloaded into a database. Using this database, the investigator then searched each medical record individually using the Electronic Patient Record System (EPRS) to determine the following demographic and clinical variables:

- *Race*: This variable was not able to be queried by the Logicare system, but was recorded in the medical record.

- *Language spoken*: Similar to the race variable, this variable was available from the medical record.

- *RSQ responses:* The RSQ was incorporated into a psychiatric screening form administered at triage. If this form was administered, a scanned electronic copy of

the form was available in the medical record. Responses to the questions as well as any qualitative responses were recorded.

- *Written presenting complaint*: Presenting complaints through the Logicare system were all entered as "problem psych" with no further information about the reason for the visit. To get further information on why the patient came into the ED, the triage nurses' evaluation of presenting complaint was also recorded.

- *Diagnosis*: Similar to the presenting complaint, the Logicare system consolidated diagnosis into larger categories, most of which were "psychiatric, other." As a result, the discharge diagnoses as well as the diagnoses given by the attending MD were also recorded from EPRS.

- *Foster care:* Individuals' foster care status was assessed initially through recording who accompanied the patient to the emergency room. As that did not appear to be a valid estimate of foster care status (several children were recorded to be accompanied by their mother at triage, who then were recorded to be in foster care in a later evaluation by a social worker), participation in the DC KIDS program, a health care program at CNMC for children in foster care, was determined to be the deciding factor of whether a child was in the foster care system or not (S. Teach, personal communication).

- *Responses to an evaluation by a social worker:* As part of standard clinical care, a subset of patients who enter the CNMC ED for psychiatric reasons are seen by a social worker. Additionally, social workers might complete a brief or a longer

evaluation. This longer evaluation contains specific questions on whether the patient displayed *violent behavior* in the past or had a *history of abuse or neglect*. The social worker marks "yes" or "no" to each of these questions and sometimes writes down qualitative information next to this item. As a result, a subset of the patients had clinical information in their medical record on violent behavior and abuse and this information was recorded through these scanned forms on EPRS.

- *Depression Diagnosis:* It is known that discharge diagnoses from emergency departments are not reliable (Gorelick, et al., 2007), even across the same visit. Therefore, diagnoses from both the social worker and the medical doctor were recorded and compared to indicate whether there was a valid diagnosis of depression. A depression diagnosis was indicated if both clinicians reported a depression diagnosis or depressive symptoms. If one clinician reported a depression diagnosis and the other clinician reported a diagnosis that was not clearly a depression diagnosis or symptoms (such as Mood Disorder NOS or Post-Traumatic Stress Disorder), a depression diagnosis was *not* indicated.

Analysis Plan

1.) Data were collected from Logicare using the previously stated search parameters. The electronic medical record was searched for additional variables.

2.) Repeated visits to the ED or duplicate entries were deleted from the analysis.

3.) Qualitative data were coded.

4.) A subset of the patients who enter the ED for psychiatric reasons were not administered the RSQ. Group differences between individuals who were and were not administered the RSQ were explored.

5.) Missing data values were examined. Concerns such as patients who left the ED before being fully evaluated and patients who may have been too young to be administered the RSQ, were evaluated at this time.

6.) Hypothesis 1 was evaluated using logistic regression with all patients who were administered the RSQ at triage.

7.) A sensitivity and specificity analysis of the RSQ in relation to psychiatric hospitalization was conducted.

8.) A subset of the patients who enter the ED for psychiatric reasons were seen by a social worker, who completed a more comprehensive psychiatric evaluation. Group differences between those patients who were seen and not seen by a social worker were evaluated.

9.) Hypotheses 2 and 3 were investigated using logistic regression on all patients who were administered the RSQ at triage and received a social work evaluation.

Statistical Analysis

Qualitative Analysis:

All written responses were coded by two independent raters to assign a numerical value for each qualitative response. Any discrepancies were settled by consensus.

Quantitative Analysis:

The statistical package SPSS version 15.0 was used to conduct all analyses. The program G*Power was used to complete all power analysis (Faul, Erdfelder, Buchner, & Lang, 2009). For the first hypothesis, it was assumed that 30% of the psychiatric patients were hospitalized (obtained from Logicare analyses) and that the other covariates in the model would explain 4% of the RSQ score (R^2 of .04, which is an estimate of a small effect size according to Cohen's criteria (Cohen, 1992)). Given these assumptions, in order to detect an odds ratio of 1.5, (meaning that the odds of being hospitalized with a positive RSQ score are 1.5 times that of being hospitalized with an RSQ negative score), with an α of .05 and a power of .95, the total sample size that was needed was 340 participants. For the second two hypotheses, it is assumed that that the overall rate of suicidal ideation in a psychiatric ED population is 40% (Horowitz, et al., 2001), and that other covariates will explain 9% of the variance in depression and abuse scores (R^2 of .09, an estimation of a medium effect size (r = .3) given Cohen's criteria). Given these assumptions, in order to detect an odds ratio of 1.5, with an α of .05 and a power of .95, the total sample size that was needed was 318. Before starting this project, it was assumed that there would be at least 800 psychiatric ED visits over the time period, because in 2006, there were 1151 DC resident patient visits to the CNMC ED for psychiatric chief complaints. It was also estimated that roughly half of the patients received a psychiatric consultation with a social worker.

Univariate regression analysis was used for the descriptive statistics. When the dependent variable was dichotomous, logistic regression was used. In logistic regression,

the dependent variable is transformed into a logit variable. Guidance on performing logistic

regression was obtained from Peng's synopsis of logistic regression in psychosocial research

(Peng, 2003). The null hypothesis in logistic regression is that there is not a linear

relationship between the predictors and the logit of the outcome variable. Because of this

transformation, the analysis evaluates the odds of an event occurring and the statistic of

choice is often the odds ratio for individual predictors of the outcome variable. Other

statistics included within logistic regressions are Wald chi-square, which indicates the

significance of individual predictors, and the Hosmer-Lemeshow test, which tests the fit of

the overall model, with an insignificant result indicative of an adequate fit to the data. For

measures of association between the predictors and the outcome variable, classification

tables of predicted probabilities are also produced. An evaluation of the overall "hit rate" of

the model, whether the predictors accurately predicted the outcome, can also be conducted

by comparing the hit rate to the chance rate of obtaining the same results. In such cases, the

hit rate is compared to the sum of the squared marginal percentages. Separate from these

classification tables, the sensitivity, specificity, positive predictive and negative predictive

values were also calculated to investigate the relationship between the screening tool (RSQ)

and the condition of interest (psychiatric hospitalization). Other statistical tests used in

logistic regression are the Breslow-Day and Tarone tests for homogeneity, which evaluates

the equality of two different odds ratios.

<center>**Results**</center>

Descriptive Statistics

  Demographic characteristics of the study sample are shown in Table 1. During the study time period, there were 640 unique patient visits to the CNMC pediatric ED who were DC residents and had psychiatric presenting complaints. There were 121 repeated or duplicate visits during the study time period, and these visits were excluded from this analysis. Ages ranged from 2 years to 21 years and the average age was 12.6 years. It is important to note that as a matter of policy, CNMC refers psychiatric patients over the age of 18 years to other EDs, as such patients could not be admitted to the inpatient unit, resulting in few patients between the ages of 18 and 21 years. Length of stay, from triage to disposition ranged from 10 to 1623 minutes, with a median length of stay of 242 minutes.

  Psychiatric diagnoses were recorded from the medical attending doctor notes. These diagnoses were not mutually exclusive and many patients had more than one diagnosis. The most common recorded diagnosis was oppositionality or disruptive behavior (43%). Affective diagnoses included depression (21%) and bipolar disorder (6%). In addition, some patients received "diagnoses" which are not listed in the DSM-IV and are not considered official psychiatric diagnoses, such as "suicidal ideation" or "suicide attempt." Other patients were given a DSM-IV discharge diagnosis with an additional symptom descriptor such as "depression with suicidal ideation." Therefore, in 18% of the sample, suicidal ideation or behavior was mentioned either as a freestanding "diagnosis" or as an additional symptom.

<center>34</center>

Table 1: Demographics of Patient Sample (N=640)

Characteristic	*n*	%
Gender		
Male	353	45
Female	287	55
Age at visit		
0 through 4 years	4	<1
5 through 9 years	130	20
10 through 14 years	289	45
15 through 17 years	202	32
18 through 21 years	15	2
Race		
African American	585	92
Hispanic	28	4
Caucasian	7	1
Native American	1	<1
Unknown	18	4
Language Spoken		
English	599	94
Spanish	16	2
French	1	<1
Unknown	24	4
Insurance Type		
Public Insurance	516	81
Private Insurance	91	14

Characteristic	*n*	%
No Insurance	33	5
Disposition		
Discharged	429	67
Hospitalized	146	23
Transferred	59	9
Left AMA	6	1
Foster Care		
Not in foster care	519	81
In foster care	121	19

A subset of the patients during this time period were not administered the RSQ. The RSQ was incorporated into the CNMC screening process through its inclusion onto a larger psychiatric screening form, which also assessed for other psychiatric concerns such as anger management and violence. In cases in which the RSQ was not administered, often this psychiatric screen was not included in the medical record, suggesting that the form had been skipped entirely. It is assumed that this form was left out due to the busy workflow of an ED and not because of the suicide screening instrument specifically. Nonetheless, potential differences between those patients who were administered the RSQ and those who were not are presented in Table 2. Categories from Table 1 that included few patients were collapsed in order to create binary variables for this analysis. There was no significant difference in gender, race, language spoken, insurance type or age between those who were administered the RSQ and those who were not. Individuals who were administered the RSQ tended to be

psychiatrically hospitalized more often than those who were not administered the RSQ,

although this trend did not reach statistical significance ($p = .06$). For a follow-up analysis,

these groups were compared by clinical diagnosis to see if there was any diagnostic

differences between patients who were administered the RSQ and those that were not.

Individuals who were administered the RSQ were not more likely to receive a depression

diagnosis or have suicidal ideation recorded in their discharge diagnosis than those who

were not administered the RSQ.

Table 2. Comparison of Demographics and Clinical Variables between Patients who were administered the RSQ at Triage and those who were not

Characteristic	RSQ administered ($n = 499$)		RSQ not administered ($n = 141$)		$X^2(1)$	p
	n	%	n	%		
Gender						
Male	276	55	77	55	.022	.88
Female	223	45	64	45		
Age						
2- 12 years	207	42	54	38	.46	.50
13-21 years	292	58	87	62		
Race						
African American	456	92	129	92	.001	.98
Non-African American	42	8	12	9		

Characteristic	RSQ administered (*n* =499)		RSQ not administered (*n* = 141)		$X^2(1)$	*p*
	n	%	*n*	%		
Language Spoken						
English	469	94	130	92	.59	.44
Other Language	30	6	11	8		
Insurance Type						
Public or No Insurance	427	86	122	86	.082	.78
Private Insurance	72	14	19	14		
Disposition						
Discharged or AMA	330	66	105	75	3.5	.06
Hospitalized or Transferred	169	34	36	26		

The evaluation of the RSQ was designed with the hope of utilizing all four RSQ questions. However, in the medical record, some patients were administered all four RSQ (RSQ4) questions and some were administered three RSQ (RSQ3) questions. The "has something very stressful happened to you in the past few days, a situation very hard to handle?" question was omitted in 305 patient visits. The researcher was present in the ED during this time period and observed that there were two different forms of the psychiatric screening sheet, one with the stress question and one without. It is assumed that there were

two versions of the RSQ that were used interchangeably and not according to any patient

characteristic.

Since so many of the patients were only administered three of the RSQ questions, it

was decided that for this analysis only the responses to the first three questions would be

considered to be "RSQ positive" in order to use all 493 patients in the analysis. There were

40 patients who screened positive on the RSQ4, who did not screen positive on the RSQ3,

meaning that they did not answer "yes" to any of the questions related to suicide, but did

endorse the "stress" question. Of these patients, only 3 had suicidal ideation mentioned in

the presenting complaint, medical attending diagnosis or social worker diagnosis. In a

prospective revalidation of the RSQ with the SIQ in this ED setting, (Ballard, unpublished

data), it was found that omitting the stress question of the RSQ improved specificity from

.40 to .57, but did not change the sensitivity. Therefore, it is assumed that only using the

first three questions will not significantly impact the ability of the RSQ to predict suicidal

ideation and behavior, and all further reference to "positive on the RSQ" is referring to a

"yes" response to any of the first 3 questions.

Additionally, for the purposes of this data analysis, data from 2-4 year olds were

excluded ($n = 4$), as, after consultation with child psychologists and psychiatrists, it was

agreed that answers to those questions from children in that age range would not be useful or

valid for this analysis. In addition, the nine individuals who left against medical advice were

also excluded from analysis, as they would not have a complete medical record or

disposition.

Hypothesis 1: RSQ, Foster Care, Insurance and Disposition

Responses to a suicide screening tool will be predictive of psychiatric hospitalization in a predominantly African American population of patients presenting to an urban pediatric ED.

The frequencies for RSQ score, gender, age, foster care status and insurance status are presented in Table 3. A positive score on the RSQ was associated with a higher percentage of psychiatric hospitalization, $X^2(1) = 25.16$, $p < .001$. In this chi-square analysis, none of the other variables were significantly associated with hospitalization, however foster care status was associated with hospitalization at the $p = .06$ level.

Table 3. Frequencies for Predictor Variables of Hospitalization

Characteristic	Discharged ($n= 324$)		Hospitalized or Transferred ($n = 169$)		$X^2(1)$	p
	n	%	n	%		
RSQ score						
Positive	130	40	108	64	25.16	<.001
Negative	194	60	61	36		
Gender						
Male	177	55	96	57	.21	.65
Female	147	45	73	43		
Foster Care status						
In Foster Care	57	18	42	25	3.58	.06
Not in Foster Care	266	82	127	75		

Characteristic	Discharged (n= 324)		Hospitalized or Transferred (n = 169)		$X^2(1)$	p
	n	%	n	%		
Insurance Type						
Public or No Insurance	278	86	143	85	.13	.72
Private Insurance	46	14	26	15		
Age						
5-12 years	139	42	65	39	.85	.36
13-21 years	186	58	104	62		

As shown in Table 4, there were a number of significant associations between the variables. In particular, there was a significant association at the .01 level between RSQ score and disposition, with a higher percentage of psychiatric hospitalization in individuals who screened positive on the RSQ. There was also a significant association between gender and RSQ score, with females screening positive on the RSQ at a higher rate than males. Additionally, there was a significant association between age and gender, with higher percentages of females in the older age group (13 to 21 years) and a higher percentage of males in the younger age group (5 to 12 years). Foster care was associated with insurance status, with individuals in foster care as more likely to be on public insurance. Insurance was also associated with age, with a higher percentage of patients on public insurance in

younger age range (5-12 years). Additionally, there was a significant association between insurance status and gender, with a higher percentage of males on public insurance than private insurance.

Table 4. Chi-Squares for Hospitalization and Predictor Variables

Predictor	1	2	3	4	5	6
1. Disposition	--					
2. RSQ score	25.45**	--				
3. Gender	.25	13.82**	--			
4. Foster Care Status	3.38	3.36	.15	--		
5. Insurance Type	.14	.35	6.30*	18.56**	--	
6. Age	.85	.25	46.90**	1.45	4.01*	--

* p<.05, ** p<.01

To control for these associations, each of these variables were added to a logistic regression model predicting disposition, as well the interactions between foster care status and RSQ, and insurance status and RSQ. Neither the interactions of RSQ by foster care, (adjusted OR = .62, 95% CI [.24-1.64], *p* = .34) nor RSQ by insurance status (adjusted OR = 1.11, 95% CI [.35-3.48], *p* = .86) reached significance, so they were left out of the final model. The results of this model are presented in Table 5. It is concluded that the model adequately fits the data, due to the non-significance on the Homer and Lemeshow chi-square tests of goodness of fit, $X^2(9) = 9.30$, *p* = .32.

Holding gender, age, foster care and insurance status at a fixed value, the odds of hospitalization for an individual who screened positive on the RSQ was 3.06 compared with the odds of hospitalization for an individual who screened negative on the RSQ, 95% CI [2.04-4.60], $p <.001$. Holding RSQ, age, foster care and insurance status at a fixed value, the odds of hospitalization for males compared with the odds of hospitalization for females was 1.5, 95% CI [1.01-2.34], $p =.04$. Holding RSQ, gender, foster care and insurance status at a fixed value, there will be a 7% increase in odds of being hospitalized with every one year increase in age, since the adjusted OR = 1.07, 95% CI [1.01-1.15], $p =.03$.   Holding RSQ, gender, age and foster care status at a fixed value, the odds of hospitalization for an individual in foster care compared with the odds of hospitalization for an individual not in foster care was 1.75, 95% CI [1.08-2.84], $p =.02$. In this model, there was no significant effect of insurance status on hospitalization.

Table 5. Logistic Regression Analysis of Hospitalization by RSQ score, Gender, Age, Foster Care Status and Insurance Type

Predictor	B	SE B	Odds Ratio	95% CI	Wald Statistic	p
Constant	-2.34	.57	.10		16.85	<.001
RSQ score	1.12	.21	3.06	[2.04, 4.60]	29.31	<.001
Gender	0.43	.21	1.54	[1.01, 2.34]	4.04	.04
Age	.07	.03	1.07	[1.01, 1.15]	4.86	.03
Foster Care	.56	.25	1.75	[1.08, 2.84]	5.13	.02
Public or No Insurance	-.19	.29	.82	[.47, 1.44]	.46	.50

As stated in the statistical plan, a classification table was used to further evaluate the ability of the model to accurately classify the data. This data is presented in Table 6. In this analysis the "hit rate" of .67 can be compared to a chance rate of obtaining the same results. The chance rate was calculated using the sum of the squared marginal percentages which was calculated to be .5485 ($.6506^2 + .3394^2$). Since an adequate model would be 25% better than chance, the proportional by chance criterion level would be .6731 (which is 1.25 * .5485). Therefore, the model is considered to be an adequate one.

Table 6. Observed and Predicted Frequencies for Disposition by Logistic Regression with the Cutoff of .5

	Predicted		
Observed	Discharged	Hospitalized	% Correct
Discharged	293	30	91
Hospitalized	132	37	22
Overall % Correct			67

Separate from the classification table, which was used to evaluate the ability of the model (with all five variables), a sensitivity and specificity analysis was conducted of only the RSQ in association with disposition. Results of this analysis are presented in Table 7. In this analysis, the RSQ had a sensitivity of .64, a specificity of .60, a positive predictive value of .45 and a negative predictive value of .76.

Table 7. Sensitivity and Specificity Analysis for RSQ and Disposition

		Disposition	
		Hospitalized	Discharged
RSQ score	Positive	108	130
	Negative	61	195

Hypothesis 2: Gender, Depression and Aggression

There will be a significant relationship between gender and presentation of suicide risk, replicating the findings of earlier studies of African American adolescents (Lambert et al., 2008).

A subset of the patients ($n = 257$) who enter the ED for psychiatric reasons are seen by a psychiatric social worker. These patients received a comprehensive evaluation, with questions concerning depression, abuse history, and history of violent behavior. Patients who received an evaluation from a psychiatric social worker while in the ED were included in the following analyses, because they represent the only patients for which there is data on these clinical factors. There was not a particular algorithm for how patients are referred for an evaluation, but from anecdotal observation, it appeared that a combination of patient severity and social worker availability influenced this decision making.

Differences between the patients who were and were not evaluated by a social worker were investigated. There were no significant differences between those individuals who received an evaluation from social work, across gender, race, age, language spoken or insurance type. However, there was a significant difference in disposition, with individuals

who received a social work evaluation as much more likely to be hospitalized $X^2(1) =$ 179.70, $p <.001$. Additionally, individuals who received a social work evaluation were more likely to screen RSQ positive, $X^2(1) = 30.10$, $p <.001$ and were more likely to be in foster care $X^2(1) = 4.66$, $p < .05$. Therefore, while there were no differences in demographics between those who were and were not assessed by a social worker, it can be inferred that those patients who were assessed represent a higher risk population, who were more likely to be hospitalized, more likely to screen positive for suicide risk and were more likely to be in foster care.

Initial frequencies and chi-square analyses for the relationship between RSQ score and gender, age, depressive diagnosis, history of violent behavior and abuse history are presented in Table 8 (which also contains variables used in Hypothesis 3). There was a significant association between gender and RSQ score, $X^2(1) = 13.86$, $p <.001$ as well as depression diagnosis and RSQ score $X^2(1) = 17.62$, $p <.001$. There was no significant relationship between history of violent behavior and RSQ score.

Table 8. Frequencies for Predictor Variables of RSQ score by Gender, Depression Diagnosis and History of Violent Behavior

Variable	RSQ negative ($n = 103$)	RSQ Positive ($n = 154$)	$X^2(1)$	p
Female Gender (%)	29	73	13.86	<.001
13 years or older (%)	59	61	.16	.69
Depression diagnosis (%) [a]	20	46	17.62	<.001
History of Violent Behavior (%)[a]	43	57	1.31	.25
History of Abuse [a] (%)	37	39	.11	.74

[a] As recorded in social work evaluation

As shown in Table 9, there are also significant associations between many of the variables in this model. There was a significant association between RSQ score and gender, with females scoring positive on the RSQ at a higher percentage than males. RSQ score was also associated with depression diagnosis, with individuals with positive scores on the RSQ as more likely to receive a depression diagnosis. Gender was associated with depression diagnosis, with females receiving a higher percentage of depression diagnoses. Gender was also associated with a history of violent behavior, with males reporting a higher percentage of violent behavior. History of violent behavior was also associated with depression diagnosis, with individuals with this history receiving a lower percentage of depression diagnoses. Additionally, a history of violent behavior was associated with a history of abuse, with individuals with a history of violent behavior reporting a higher percentage of

abuse history. Age was associated with depression, with patients' ages 13 years and above

reporting a higher percentage of depression.

Table 9. Chi-Squares for RSQ and Predictor Variables

Predictor	1	2	3	4	5	6
1. RSQ score	--					
2. Gender	12.71**	--				
3. Depression Diagnosis	17.62**	8.04**	--			
4. History of Violent Behavior	.97	6.91*	29.47**	--		
5. Age	.06	20.58**	7.68**	3.62	--	
6. History of Abuse	.11	2.41	.11	10.67*	.26	--

*p<.05, ** p<.01

Tables 10 and 11 present the logistic regression analyses for age, depression

diagnosis and history of violent behavior in predicting RSQ for girls and boys. For girls,

when holding age and history of violent behavior at a fixed value, the odds of screening

positive on the RSQ when being diagnosed with depression, was 2.75 over the odds of

screening positive on the RSQ when not having a diagnosis of depression, 95% CI [1.03-

7.2], $p < .05$.   For boys, when holding age and history of violent behavior at a fixed value,

the odds of screening positive on the RSQ when being diagnosed with depression, was 4.17

over the odds of screening positive on the RSQ when not having a diagnosis of depression,

95% CI [1.74-10.02], $p < .01$. There was no statistically significant difference in the odds

ratios for depression and RSQ score across gender, according to the Breslow-Day and

Tarone's tests of homogeneity of the odds ratio: Breslow-Day $X^2(1) = .98$, p =.66, Tarone's:

$X^2(1) = .98$, $p = .66$.

There was no significant association between history of violent behavior and RSQ

score for either girls or boys. Additionally, for boys, holding depression and violent

behavior constant, there was a .10 decrease in odds of screening positive on the RSQ with

every year increase in age, since the adjusted OR = .90, 95% CI [.81-.99], $p < .05$. This

relationship was not significant in girls and further analysis of the interaction between

gender and age in predicting RSQ score did not show significance, adjusted OR = .97, 95%

CI [.79, 1.17], $p = .72$.

Table 10. Logistic Regression Analysis of RSQ by Depression Diagnosis and History of Violent Behavior for Girls

Predictor	B	SE B	Odds Ratio	95% CI	Wald Statistic	p
Constant	1.40	1.24	4.05		1.27	.26
Depression Diagnosis	1.01	.50	2.75	[1.03, 7.2]	2.10	.04
History of Violent Behavior	.03	.46	1.03	[.42, 2.55]	.004	.95
Age	-.06	.09	.94	[.79, 1.12]	1.27	.26

Table 11. Logistic Regression Analysis of RSQ by Depression Diagnosis and History of Violent Behavior for Boys

Predictor	B	SE B	Odds Ratio	95% CI	Wald Statistic	*p*
Constant	.74	.74	2.10		1.01	.31
Depression Diagnosis	1.43	.45	4.17	[1.74, 10.02]	10.24	.001
History of Violent Behavior	.34	.42	1.40	[.62, 3.17]	.67	.42
Age	-.11	.05	.90	[.81, .99]	4.45	.04

Hypothesis 3: Abuse and Age

There will be a significant relationship between abuse and suicide risk, which will be moderated by age.

Initial frequencies and chi-square analyses for the relationship between RSQ score, age and abuse history were presented in Tables 8 and 9. There was no significant relationship between age and abuse history, age and RSQ score, or abuse history and RSQ score.

A logistic regression analysis was conducted on the variables in the model, the results of which are presented in Table 12. Neither age, abuse history nor the interaction between age and abuse history was associated with a change in odds of screening positive on the RSQ.

Table 12. Logistic Regression Analysis of RSQ by Age, Abuse History and the Interaction between Age and Abuse History

Predictor	B	SE B	Odds Ratio	95% CI	Wald Statistic	*p*
Constant	.57	.27	1.76		4.30	.04
Age	-.30	.34	.74	[.38, 1.45]	.76	.39
Abuse History	-.52	.42	.60	[.26, 1.36]	1.50	.22
Age by Abuse History	1.02	.55	2.77	[.95, 8.11]	3.45	.06

While none of the analyses were significant, the interaction between age and abuse history obtained a *p* of .06. Due to this finding and the background literature which has demonstrated the relationship between abuse and suicide risk, further exploration of the results were conducted.

For the purposes of this exploration, a new variable was created, the RSQ Cumulative. In this variable, all of the "yes" answers to the RSQ questions were added, to create a score from 0 to 3. While this variable has not been previously used in research on the RSQ, it was considered a post-hoc measure of severity of suicidal thoughts and behavior. A multiple regression analysis was conducted, using RSQ Cumulative as the dependent variable. The analysis summary is presented in Table 13. In this analysis, there was a significant association between abuse and RSQ Cumulative score, $t(235) = -2.07, p < .05$, with the presence of an abuse history associated with lower RSQ Cumulative scores. There was also a significant interaction between age and abuse in predicting RSQ Cumulative score, $t(235) = 2.29, p < .05$. Figure 2 displays the mean RSQ Cumulative scores for

patients across age and abuse history. This graph indicates that for individuals without an

abuse history, there is little difference in RSQ Cumulative score across age groups.

However, with individuals who have an abuse history, older adolescents have higher mean

RSQ cumulative scores, while younger adolescents have lower mean RSQ cumulative

scores.

Table 13. Regression Analysis Summary for Age, Depression and Abuse History Predicting
RSQ Cumulative

Predictor	B	SE B	β	*t*	*p*
Constant	1.10	0.28		3.94	<.01
Age [a]	-0.69	0.39	-0.34	-1.74	.08
Abuse History	-0.94	0.45	-0.46	-2.07	.04
Abuse by Age	.62	.27	0.65	2.29	.02

[a] stratified by 5-12 years and 13-21 years

Figure 2. Interaction of Age and Abuse History in Predicting RSQ Cumulative
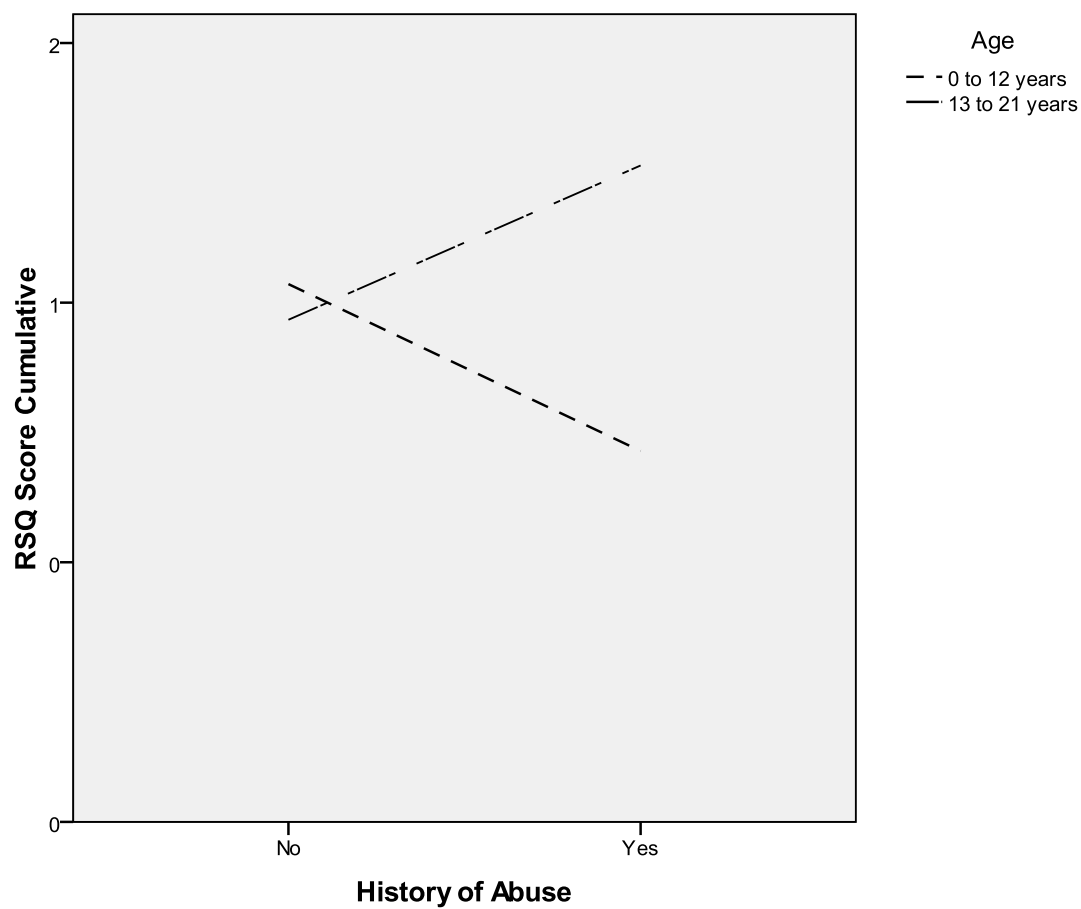
Discussion

The current study investigated the utility of a suicide screening tool in a pediatric ED with a high prevalence of African American and lower income patients. It was found that a positive score on the RSQ predicted psychiatric hospitalization in the patient sample. Being in foster care was also associated with psychiatric hospitalization, but being on public insurance was not, while neither variable was associated with RSQ score. Additionally, female gender and depression diagnosis were associated with suicide risk as measured by the RSQ. There was an interaction between age and abuse history, with individuals without an abuse history showing little difference in suicide risk by age, and patients with an abuse history showing decreased levels of suicidal thoughts and behaviors at younger ages and increased levels of suicidal thoughts and behaviors at older ages.

Hypothesis 1: RSQ, Foster Care, Insurance and Disposition

Overall, patients scoring positive on the RSQ were three times more likely to be hospitalized for psychiatric reasons than patients scoring negative, when controlling for age, gender, insurance and foster care status. This finding suggests that the RSQ could be a useful measure for predicting hospitalization in a predominately African American, lower income patient population and also has implications for patient flow in the ED. If it is discovered earlier in the visit that a patient is likely to be hospitalized, additional steps could be taken to alert ED staff to this possibility. When the RSQ was implemented at another pediatric ED, a positive response to the RSQ initiated a clinical practice guideline, which included a search of the patient, a one-to-one sitter as well as contacting psychiatry staff

(Horowitz, personal communication). In the current ED, since not every psychiatric patient is evaluated by a psychiatric social worker, perhaps a RSQ positive response could trigger an automatic psychiatric consultation, which could then prompt a social worker to assess psychiatric bed availability.

Another important finding from this analysis is that suicidal thoughts and behaviors are prevalent in this demographic population. Overall, 48% of the sample screened positive on the RSQ. This prevalence is comparable to the percentage of patients who screened positive on the SIQ in the initial RSQ validation study (44%) (Horowitz, et al., 2001). This percentage of positive responses demonstrates that this population of predominately African American and lower income patients presents to the ED with suicidal thoughts and behaviors, which cannot be purely explained by social factors such as income or foster care. As described in the introduction, data from focus groups have suggested that African American adolescents and their parents do not see suicide as common in their community (Molock, et al., 2007; Schwartz, et al., 2010). In contrast, this study suggests that suicide is a concern in this ED population.

Patients in foster care were more likely to be hospitalized, but were not more likely to score positive on the RSQ in this study. Therefore, at the time of their ED visits, patients in foster care did not report increased rates of suicidal thoughts and behaviors. The research literature suggests that individuals in foster care report higher rates of suicidality, but these studies differ from the current investigation in a number of ways. First, a full evaluation of the patient's history of foster care placement was not completed; it is possible that other patients could have previously been placed in the foster care system and then returned to

their biological family. Second, each patient was administered the RSQ in front of a

caregiver, which may have impacted the honesty of their responses, as children and

adolescents may be less comfortable disclosing suicidal thoughts in front of foster parents or

social workers. Third, much of the literature is conducted with older adolescents or young

adults out of the foster care system (Vinnerljung, et al., 2006); these samples may

experience or report differing levels of suicide risk. Lastly, this study was conducted in one

institution with a specific health care program for individuals in foster care. It is not known

how specialized healthcare could have affected the suicide risk in this population.

Additionally, whereas hypotheses as to why foster care patients may be hospitalized

at a higher rate is beyond the purview of this discussion, several factors may be considered.

First, the events that lead to a child being placed in foster care, such as the death of a

relative, abuse or neglect can lead to a population at increased risk for psychiatric illness

(Pilowsky & Wu, 2006). Furthermore, the effects of living with a non-related caregiver may

also be a risk factor for psychiatric distress (Nrugham, et al., 2008a). Lastly, clinicians in

the ED may take into account the patient's experience in foster care when deciding the

disposition. A patient who has a stable family environment may be determined to be less of

a risk to harm themselves or others than a patient in an unfamiliar living arrangement. A

study investigating psychiatric diagnoses, symptoms and social factors in foster care

samples with an eye towards suicidality could further explore the development of suicide

risk in this population.

Insurance status was not associated with either hospitalization or RSQ score, which

replicates results from a similar study with community mental health adult populations

(Engleman, et al., 1998). Furthermore, there was no evidence of an interaction between RSQ and foster care, or RSQ and insurance status in predicting psychiatric hospitalization. The sample size of 493, while higher than the estimated sample size used in the power calculation (340), was lower than the predicted sample size (800 patients), due to the preponderance of repeat visits over this time period. As a result, the sample size may not have been large enough to evaluate these particular hypotheses. Additionally, in a population where 86% of the patients have public or no insurance, this lack of variance might have limited the predictive power of this variable. In sum, for clinicians in this particular ED, knowing whether a patient is in foster care or on public health insurance will not help predict suicide risk.

The sensitivity and specificity of the RSQ with respect to psychiatric hospitalization warrant particular mention. The analysis was conducted in a similar manner as to the initial validation study (Horowitz, et al., 2001), however, with hospitalization as the condition of interest, rather than the SIQ. The results demonstrated a sensitivity of .64, which means out of 100 patients who are hospitalized, 64 of them would screen positive on the RSQ (36 would be "false negatives"). Additionally, with a specificity of .60, out of 100 patients who were discharged, 60 of them would screen negative on the RSQ, with 40 patients being "false positives." It is important to note that the RSQ was developed to assess suicide risk, rather than risk of hospitalization. Therefore the low sensitivity and specificity in association with disposition may not be concerning, especially since many other factors besides suicidality influence clinical decision-making, including violence potential or psychosis. However, this analysis gives important data for the implementation of such a

screening tool in the ED. The specificity indicates that there will be a substantial percentage of patients who screen positive on the RSQ who are not hospitalized. As a result, any follow-up assessment or intervention connected to the screening measure will need to take into account this false positive rate as to avoid overburdening ED resources.

From a diagnostic perspective, roughly one-fifth of the patient population received a depressive diagnosis and 18% received a non-DSM-IV "diagnosis" related to suicidal thoughts or behaviors. However, when administered the RSQ, 48% of the sample screened positive for suicidal thoughts and behaviors, suggesting that suicide risk occurs beyond the context of depressive disorders. These results suggest that in order to identify the most patients at risk for suicide, ED screening efforts may focus on all patients presenting for psychiatric reasons, regardless of diagnosis.

Hypothesis 2: Gender, Depression and Aggression

The findings from the second hypothesis confirm much of what is known about gender and depression in the development of suicide risk. Female gender was associated with increased risk of screening positive on the RSQ. Female gender was also associated with depression diagnosis, replicating another finding from the literature (Canetto, 1997; Epstein & Spirito, 2010). Previous work has suggested that girls may be at higher risk for suicidal thoughts and behavior because they are more likely to experience depression (Allison, et al., 2001; Prigerson & Slimack, 1999). However, there could also be other factors relating to gender differences in suicidality. In a longitudinal study of adolescent suicide attempters, there was a gender difference in suicide attempt rates, starting around the age of 12 or 13 years, which disappeared by the age of 19 years (Lewinsohn, Rohde, Seeley,

& Baldwin, 2001). Whereas gender differences in depression also appeared around 12 years, they did not resolve at 19 years and continued to the study's conclusion at 24 years. The authors posit that gender differences in suicide rates may be due to factors other than depression. Since the current study was not longitudinal, it is not known how the relationship between gender, depression and suicide develops over time. Additionally, other factors that could relate to gender differences in suicidal behavior such as post-traumatic stress disorder or alcohol abuse were not assessed in this study. Further work with larger sample sizes could evaluate the effect of other clinical symptoms and diagnoses on gender differences in suicide risk in the pediatric ED.

While there was a significant relationship between gender and depression as well as gender and suicide, the prediction of suicide risk, given a depression diagnosis, did not differ across genders. From a clinician's point of view, this means that if a boy enters the ED reporting depression, he would be at similar risk for suicidal thoughts as a girl with similar depressive symptoms. This finding is at odds with some of the current literature (Lambert, et al., 2008). In particular, one study found that girls who experience moderate levels of depression were more likely to report suicide risk than boys experiencing similar levels of depression (Allison, et al., 2001). In the current investigation, the depression diagnosis was collapsed into a binary variable, meaning that there was no measure of severity that may have elucidated gender differences in this population. Additionally, it is possible that this study did not obtain the statistical power necessary to answer this question, as the projected sample size was slightly larger than the actual sample size. Further exploration of this question with a larger sample size may find different results. Until that time, it appears that

in this ED sample, there is a similar relationship between depression and suicide risk for boys and girls. This finding has implications for interventions in the ED as suicide prevention efforts may be most effective when targeting depression across gender. Further studies should also examine the effects of targeting depressive symptoms to evaluate the impact of such treatment on suicidality by gender.

In contrast to much of the adolescent suicide literature (Brent, et al., 1999; Daniel, et al., 2009; Lambert, et al., 2008; Prigerson & Slimack, 1999), a history of violent behavior was not associated with suicide risk in either boys or girls. It is possible that the variable used in this analysis was not a good proxy for aggression and violence. For the depression diagnosis variable, the input of two clinicians was taken into account; for the history of violence variable, there was only one informant from a single question. The variable may not have adequately captured aggression; further work could use a structured assessment to identify violence and aggression (Daniel, et al., 2009). Additionally, with around 50% of the patient population reporting a history of violent behavior, this variable might not have been specific enough to predict suicide risk. Whereas more formal research of aggression in this population is needed, these results suggest that disclosure of past history of violent behavior in the ED does not predict suicide risk as measured by the RSQ.

In the development of the hypotheses for this investigation, a paper by Lambert et al (2008) was used as a model to describe the relationship between gender, depression, aggression and suicide risk. The findings of this study diverged from some of those findings, particularly around the influence of violence and aggression. In particular, in the Lambert study, history of aggressive behavior was related to suicidal behavior in boys, but

not girls, in a sample of urban, predominately African American children.   The current

investigation differed from the Lambert study in terms of measures used, design, as well as

statistical techniques. The Lambert investigation also evaluated the impact of community

violence on depression and suicidal behavior. As discussed previously, the violence

variable in the current study was likely not sensitive enough to detect differences in suicide

risk. However, this divergence also suggests that suicide risk factors from one patient

population do not necessarily apply to risk factors in other patient populations. Therefore,

investigations which assess the impact of risk factors in different patient populations, such

as the ED, are needed to ensure that the risk factors are comparable and that clinicians are

using the most appropriate assessments and interventions for their patients.

Hypothesis 3: Abuse and Age

In contrast to much of the literature on abuse and suicide risk (Behnken, Le, Temple,

& Berenson, 2010; Bruffaerts, et al., 2010; Cutajar, et al., 2010; Logan, Leeb, & Barker,

2009), a history of abuse was not associated with RSQ score in the initial analysis. There

are several factors that could be related to this result. First, several of the reported studies

have used data from adult patients to explore the relationship between childhood trauma and

suicidality (Bruffaerts, et al., 2010; Plunkett, et al., 2001; Stein, et al., 2010). Adult

informants on childhood abuse will have a different time frame to understand their trauma,

which may lead to different rates of reporting. Additionally, children and adolescents may

be reluctant to share past or current abuse histories, particularly in front of parental figures

in ED settings. Other demographic variables, such as gender and race may also affect the

relationship between abuse and suicidality (Behnken, et al., 2010; Logan, et al., 2009),

which this dataset was not powered to take into account. Furthermore, the type of abuse, relationship with the abuser, as well as the age at which the abuse occurred, were not known and could have impacted this relationship between abuse and suicide risk.

Lastly, abuse history may not be a useful variable in predicting suicide risk during an ED visit. The suicide prevention literature is currently disentangling risk factors for suicide from warning signs for suicide. Perhaps in this context, a history of sexual abuse is a risk factor, meaning a static factor that places an individual at risk for a particular behavior or condition in the long term (Rudd, et al., 2006). In contrast, a warning sign would be an immediate symptom (such as agitation) which signals proximity to an event in the short term. In this way, a history of sexual abuse may signal a clinician that the child may be at higher risk to attempt suicide over his or her lifetime, but will not indicate whether the child is imminently suicidal or needs to be hospitalized.

As a post-hoc analysis, when entered into a multiple regression model, there was a significant interaction between age and abuse. While the implications of this finding should not be overstated, they do suggest that age interacts with abuse history in association with suicide risk, with abused adolescents at increased risk over abused children. These results parallel an Australian study of adolescents and young adults who had previously experienced sexual abuse, in which older age at the time of abuse was associated with increased suicidal thoughts and behaviors (Plunkett, et al., 2001). It is possible that older age is associated with a greater understanding of the abuse, which may impact their views of themselves and later depressed affect. It is posited that other factors such as cognitive distortions (Weismoore & Esposito-Smythers, 2010) and impulsivity (Braquehais, Oquendo,

Baca-Garcia, & Sher, 2010) may mediate the relationship between abuse and suicide risk.

Perhaps increased age at the time of abuse differentially affects these factors, which leads to

different rates of suicidal thoughts and behaviors. Additional work should obtain more

information on abuse history in relation to suicide risk in order to better understand the

developmental trajectory of abuse and suicidality.

A last important note is that 38% of the study population reported a history of abuse.

However, this percentage was obtained from the patients who were seen by a social worker,

a subset which contained a higher percentage of patients in foster care. Therefore, the

percentage of patients who report abuse may not represent the overall rates for psychiatric

patients in this ED. However, this still suggests that a history of abuse is prevalent in

patients presenting for psychiatric reasons in this ED, which could influence which

interventions would be most appropriate for this patient population.

Limitations

There are several limitations to this investigation, some of which were mentioned

throughout the discussion. First, not all patients were administered the RSQ. While there

were no significant demographic or clinical differences between those patients who were

administered the RSQ and those who were not; it is possible that undetected differences

would impact the generalizability of the study. Another important limitation is the use of the

three-item RSQ. The RSQ was validated as a four-item measure, but since the fourth

question (Has something very stressful happened to you in the past few weeks?) was not

administered consistently, the researcher decided to use the three-item tool in order to obtain

data from more patients. Other evaluations of the four-item RSQ have questioned the utility

of this question (Folse & Hahn, 2009) and a multisite revalidation of the tool using the SIQ as a gold standard is currently in progress. However, until that data is fully analyzed, the absence of the fourth stress question is a limitation of the study.

Additionally, since this was a retrospective analysis of clinical variables, there were no validated instruments beyond the RSQ. Many of the clinical variables, such as depression, abuse and history of violence, would require confirmation from an outside source to make an accurate diagnosis, as it is known that ED diagnoses are not reliable (Gorelick, et al., 2007). However, it is important to note that these variables are used by ED clinicians around the country, each day, to make crucial decisions about discharge, reporting to Child Protective Services or psychiatric hospitalization. Therefore, until validated instruments are integrated in the ED mental health care, researchers are limited to these variables for retrospective analyses of medical records. Additionally, the RSQ was developed to predict suicidal ideation, not psychiatric hospitalization, as was evaluated in this study. Currently, there are other innovative suicide screens, such as ones by Nock's group incorporating emotional Stroop tasks, which have been shown to predict suicide attempts in the next six months (Cha, Najmi, Park, Finn, & Nock, 2010). Further work should investigate whether the RSQ can similarly predict future behavior.

Lastly, the power of the study is another limitation. Because the RSQ was only used in the CNMC ED for nine months, there was a limited amount of patient data that could be collected. Additionally, repeat visits were considered to be confounding factors and were thus dropped from the results; 308 of the patients had at least one additional visit to the ED during this time period. These extra data would have been helpful in increasing the power

of the study. While the study's *n* was still large enough for the logistic regression for

Hypothesis 1, the power of the analyses of patients who were assessed by social work (for

Hypotheses 2 and 3) may have suffered.

Implications

The aims of this investigation were twofold. First, the utility of the RSQ was

evaluated, to see whether the screening tool could identify individuals who need further

psychiatric assistance in the ED. In this respect, the investigation was successful; the RSQ

does predict hospitalization in a diverse population, which has implications for ED patient

care, as stated previously. However, this measure can also be used to identify patients in

most need of intervention. There are currently several suicide specific interventions which

focus on intervening with suicidal adolescents in order to prevent psychiatric hospitalization

(Rotheram-Borus, et al., 2000; Stanley, et al., 2009). The RSQ could be a useful tool in

identifying those patients who could most benefit from this kind of intervention.

Second, clinical and demographic variables related to suicide risk were explored to

investigate whether these factors could be useful targets for intervention. Researchers have

posited that many suicide interventions treat suicidal adolescents as a uniform group, rather

than individuals with a wide range of risk and protective factors (Daniel & Goldston, 2009).

These researchers have suggested that the lack of gender, culture and development-specific

intervention may be related to the dearth of effective treatments for suicidal adolescents.

Overall, the findings from this study suggest that appropriate clinical intervention in the ED

could include treatments for depression for both girls and boys, with the understanding that

girls will likely report more depression and suicidal behavior. There is no evidence from

this investigation that boys and girls would require gender-specific suicide interventions. Additionally, there is no support from this investigation for a focus on aggressive behavior in such an intervention. As for abuse, older adolescents with a history of abuse may be at increased risk for suicide and therefore may require suicide interventions sensitive to interpersonal trauma. The high prevalence rate of abuse across this sample also suggests that interventions that focus on familial functioning and communication such as those already studied in some EDs (Rotheram-Borus, et al., 2000), should be implemented with caution in this ED, as they might not be appropriate for this patient population.

Therefore, the suicide risk factors in the pediatric ED are largely similar to previously established suicide risk factors for adolescents. However, the results differ in some important ways. These findings suggest that a kind of "one-size-fits-all" approach may not be appropriate for suicide prevention efforts in EDs and careful analysis before such assessments and intervention efforts are implemented may be beneficial for all involved.

Conclusions

A suicide screening tool, such as the RSQ, can identify children at increased risk for suicidal ideation as well as psychiatric hospitalization, in a predominately African American, lower income pediatric ED sample. Demographic and clinical variables in this sample also have implications for which suicide focused interventions and treatment may be most appropriate. In particular, depression and abuse history may be important factors to target in future ED suicide prevention efforts.

References

Allison, S., Roeger, L., Martin, G., & Keeves, J. (2001). Gender differences in the relationship between depression and suicidal ideation in young adolescents. *Aust N Z J Psychiatry, 35*(4), 498-503.

Asarnow, J. R., Baraff, L. J., Berk, M., Grob, C., Devich-Navarro, M., Suddath, R., et al. (2008). Pediatric Emergency Department Suicidal Patients: Two-Site Evaluation of Suicide Ideators, Single Attempters, and Repeat Attempters. *J Am Acad Child Adolesc Psychiatry*.

Behnken, M. P., Le, Y. C., Temple, J. R., & Berenson, A. B. (2010). Forced sexual intercourse, suicidality, and binge drinking among adolescent girls. *Addict Behav, 35*(5), 507-509.

Bennewith, O., Peters, T. J., Hawton, K., House, A., & Gunnell, D. (2005). Factors associated with the non-assessment of self-harm patients attending an Accident and Emergency Department: results of a national study. *J Affect Disord, 89*(1-3), 91-97.

Biddle, L., Gunnell, D., Sharp, D., & Donovan, J. L. (2004). Factors influencing help seeking in mentally distressed young adults: a cross-sectional survey. *Br J Gen Pract, 54*(501), 248-253.

Borowsky, I. W., Ireland, M., & Resnick, M. D. (2001). Adolescent suicide attempts: risks and protectors. *Pediatrics, 107*(3), 485-493.

Braquehais, M. D., Oquendo, M. A., Baca-Garcia, E., & Sher, L. (2010). Is impulsivity a link between childhood abuse and suicide? *Compr Psychiatry, 51*(2), 121-129.

Brent, D. A., Baugher, M., Bridge, J., Chen, T., & Chiappetta, L. (1999). Age- and sex-related risk factors for adolescent suicide. *J Am Acad Child Adolesc Psychiatry, 38*(12), 1497-1505.

Bridge, J. A., Goldstein, T. R., & Brent, D. A. (2006). Adolescent suicide and suicidal behavior. *J Child Psychol Psychiatry, 47*(3-4), 372-394.

Bridge, J. A., Greenhouse, J. B., Weldon, A. H., Campo, J. V., & Kelleher, K. J. (2008). Suicide trends among youths aged 10 to 19 years in the United States, 1996-2005. *JAMA, 300*(9), 1025-1026.

Bruffaerts, R., Demyttenaere, K., Borges, G., Haro, J. M., Chiu, W. T., Hwang, I., et al. (2010). Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br J Psychiatry, 197*(1), 20-27.

Canetto, S. S. (1997). Meanings of gender and suicidal behavior during adolescence. *Suicide Life Threat Behav, 27*(4), 339-351.

Cauce, A. M., Domenech-Rodriguez, M., Paradise, M., Cochran, B. N., Shea, J. M., Srebnik, D., et al. (2002). Cultural and contextual influences in mental health help seeking: a focus on ethnic minority youth. *J Consult Clin Psychol, 70*(1), 44-55.

Cerel, J., Jordan, J. R., & Duberstein, P. R. (2008). The impact of suicide on the family. *Crisis, 29*(1), 38-44.

Cha, C. B., Najmi, S., Park, J. M., Finn, C. T., & Nock, M. K. (2010). Attentional bias toward suicide-related stimuli predicts suicidal behavior. *J Abnorm Psychol, 119*(3), 616-622.

Cloutier, P., Kennedy, A., Maysenhoelder, H., Glennie, E. J., Cappelli, M., & Gray, C. (2010). Pediatric mental health concerns in the emergency department: caregiver and youth perceptions and expectations. *Pediatr Emerg Care, 26*(2), 99-106.

Cohen, J. (1992). A power primer. *Psychol Bull, 112*(1), 155-159.

Crandall, C., Fullerton-Gleason, L., Aguero, R., & LaValley, J. (2006). Subsequent suicide mortality among emergency department patients seen for suicidal behavior. *Acad Emerg Med, 13*(4), 435-442.

Cutajar, M. C., Mullen, P. E., Ogloff, J. R., Thomas, S. D., Wells, D. L., & Spataro, J. (2010). Suicide and fatal drug overdose in child sexual abuse victims: a historical cohort study. *Med J Aust, 192*(4), 184-187.

Daniel, S. S., & Goldston, D. B. (2009). Interventions for suicidal youth: a review of the literature and developmental considerations. *Suicide Life Threat Behav, 39*(3), 252-268.

Daniel, S. S., Goldston, D. B., Erkanli, A., Franklin, J. C., & Mayfield, A. M. (2009). Trait anger, anger expression, and suicide attempts among adolescents and young adults: a prospective study. *J Clin Child Adolesc Psychol, 38*(5), 661-671.

Dupere, V., Leventhal, T., & Lacourse, E. (2009). Neighborhood poverty and suicidal thoughts and attempts in late adolescence. *Psychol Med, 39*(8), 1295-1306.

Eaton, D. K., Kann, L., Kinchen, S., Shanklin, S., Ross, J., Hawkins, J., et al. (2010). Youth risk behavior surveillance - United States, 2009. *MMWR Surveill Summ, 59*(5), 1-142.

Engleman, N. B., Jobes, D. A., Berman, A. L., & Langbein, L. I. (1998). Clinicians' decision making about involuntary commitment. *Psychiatr Serv, 49*(7), 941-945.

Epstein, J. A., & Spirito, A. (2010). Gender-specific risk factors for suicidality among high school students. *Arch Suicide Res, 14*(3), 193-205.

Evans, E., Hawton, K., & Rodham, K. (2005). Suicidal phenomena and abuse in adolescents: a review of epidemiological studies. *Child Abuse Negl, 29*(1), 45-58.

Evans, J., Evans, M., Morgan, H. G., Hayward, A., & Gunnell, D. (2005). Crisis card following self-harm: 12-month follow-up of a randomised controlled trial. *Br J Psychiatry, 187*, 186-187.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods, 41*(4), 1149-1160.

Fergusson, D. M., Horwood, L. J., Ridder, E. M., & Beautrais, A. L. (2005). Suicidal behaviour in adolescence and subsequent mental health outcomes in young adulthood. *Psychol Med, 35*(7), 983-993.

Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychol Med, 30*(1), 23-39.

Folse, V. N., & Hahn, R. L. (2009). Suicide risk screening in an emergency department: engaging staff nurses in continued testing of a brief instrument. *Clin Nurs Res, 18*(3), 253-271.

Freedenthal, S. (2007). Racial disparities in mental health service use by adolescents who thought about or attempted suicide. *Suicide Life Threat Behav, 37*(1), 22-34.

Gairin, I., House, A., & Owens, D. (2003). Attendance at the accident and emergency department in the year before suicide: retrospective study. *Br J Psychiatry, 183*, 28-33.

Goldstein, A. B., Silverman, M. A., Phillips, S., & Lichenstein, R. (2005). Mental health visits in a pediatric emergency department and their relationship to the school calendar. *Pediatr Emerg Care, 21*(10), 653-657.

Gorelick, M. H., Knight, S., Alessandrini, E. A., Stanley, R. M., Chamberlain, J. M., Kuppermann, N., et al. (2007). Lack of agreement in pediatric emergency department discharge diagnoses from clinical and administrative data sources. *Acad Emerg Med, 14*(7), 646-652.

Grupp-Phelan, J., Delgado, S. V., & Kelleher, K. J. (2007). Failure of psychiatric referrals from the pediatric emergency department. *BMC Emerg Med, 7*, 12.

Grupp-Phelan, J., Harman, J. S., & Kelleher, K. J. (2007). Trends in mental health and chronic condition visits by children presenting for care at U.S. emergency departments. *Public Health Rep, 122*(1), 55-61.

Grupp-Phelan, J., Mahajan, P., Foltin, G. L., Jacobs, E., Tunik, M., Sonnett, M., et al. (2009). Referral and resource use patterns for psychiatric-related visits to pediatric emergency departments. *Pediatr Emerg Care, 25*(4), 217-220.

Grupp-Phelan, J., Wade, T. J., Pickup, T., Ho, M. L., Lucas, C. P., Brewer, D. E., et al. (2007). Mental health problems in children and caregivers in the emergency department setting. *J Dev Behav Pediatr, 28*(1), 16-21.

Harris, T. L., & Molock, S. D. (2000). Cultural orientation, family cohesion, and family support in suicide ideation and depression among African American college students. *Suicide Life Threat Behav, 30*(4), 341-353.

Horowitz, L., Ballard, E., Teach, S. J., Bosk, A., Rosenstein, D. L., Joshi, P., et al. (2010). Feasibility of Screening Patients With Nonpsychiatric Complaints for Suicide Risk in a Pediatric Emergency Department: A Good Time to Talk? *Pediatr Emerg Care*.

Horowitz, L., Ballard, E. D., & Pao, M. (2009). Suicide screening in schools, primary care and emergency departments. *Curr Opin Pediatr*.

Horowitz, L., Wang, P. S., Koocher, G. P., Burr, B. H., Smith, M. F., Klavon, S., et al. (2001). Detecting suicide risk in a pediatric emergency department: development of a brief screening tool. *Pediatrics, 107*(5), 1133-1137.

Houry, D., Kemball, R. S., Click, L. A., & Kaslow, N. J. (2007). Development of a brief mental health screen for intimate partner violence victims in the emergency department. *Acad Emerg Med, 14*(3), 202-209.

Huey, S. J., Jr., Henggeler, S. W., Rowland, M. D., Halliday-Boykins, C. A., Cunningham, P. B., Pickrel, S. G., et al. (2004). Multisystemic therapy effects on attempted suicide by youths presenting psychiatric emergencies. *J Am Acad Child Adolesc Psychiatry, 43*(2), 183-190.

Husky, M. M., McGuire, L., Flynn, L., Chrostowski, C., & Olfson, M. (2009). Correlates of help-seeking behavior among at-risk adolescents. *Child Psychiatry Hum Dev, 40*(1), 15-24.

Ialongo, N. S., Koenig-McNaught, A. L., Wagner, B. M., Pearson, J. L., McCreary, B. K., Poduska, J., et al. (2004). African American children's reports of depressed mood, hopelessness, and suicidal ideation and later suicide attempts. *Suicide Life Threat Behav, 34*(4), 395-407.

Joe, S., Baser, R. S., Neighbors, H. W., Caldwell, C. H., & Jackson, J. S. (2009). 12-month and lifetime prevalence of suicide attempts among black adolescents in the National Survey of American Life. *J Am Acad Child Adolesc Psychiatry, 48*(3), 271-282.

Joe, S., Canetto, S. S., & Romer, D. (2008). Advancing prevention research on the role of culture in suicide prevention. *Suicide Life Threat Behav, 38*(3), 354-362.

Kaslow, N. J., Leiner, A. S., Reviere, S., Jackson, E., Bethea, K., Bhaju, J., et al. (2010). Suicidal, abused African American women's response to a culturally informed intervention. *J Consult Clin Psychol, 78*(4), 449-458.

King, C. A., Kramer, A., Preuss, L., Kerr, D. C., Weisse, L., & Venkataraman, S. (2006). Youth-Nominated Support Team for Suicidal Adolescents (Version 1): a randomized controlled trial. *J Consult Clin Psychol, 74*(1), 199-206.

King, C. A., O'Mara, R. M., Hayward, C. N., & Cunningham, R. M. (2009). Adolescent suicide risk screening in the emergency department. *Acad Emerg Med, 16*(11), 1234-1241.

Lambert, S. F., Copeland-Linder, N., & Ialongo, N. S. (2008). Longitudinal associations between community violence exposure and suicidality. *J Adolesc Health, 43*(4), 380-386.

Latzman, R. D., Gratz, K. L., Young, J., Heiden, L. J., Damon, J. D., & Hight, T. L. (2010). Self-injurious thoughts and behaviors among youth in an underserved area of the Southern United States: exploring the moderating roles of gender, racial/ethnic background, and school-level. *J Youth Adolesc, 39*(3), 270-280.

Lewinsohn, P. M., Rohde, P., Seeley, J. R., & Baldwin, C. L. (2001). Gender differences in suicide attempts from adolescence to young adulthood. *J Am Acad Child Adolesc Psychiatry, 40*(4), 427-434.

Logan, J. E., Leeb, R. T., & Barker, L. E. (2009). Gender-specific mental and behavioral outcomes among physically abused high-risk seventh-grade youths. *Public Health Rep, 124*(2), 234-245.

Merchant, C., Kramer, A., Joe, S., Venkataraman, S., & King, C. A. (2009). Predictors of multiple suicide attempts among suicidal black adolescents. *Suicide Life Threat Behav, 39*(2), 115-124.

Minniear, T. D., Gilmore, B., Arnold, S. R., Flynn, P. M., Knapp, K. M., & Gaur, A. H. (2009). Implementation of and barriers to routine HIV screening for adolescents. *Pediatrics, 124*(4), 1076-1084.

Molock, S. D., Barksdale, C., Matlin, S., Puri, R., Cammack, N., & Spann, M. (2007). Qualitative study of suicidality and help-seeking behaviors in African American adolescents. *Am J Community Psychol, 40*(1-2), 52-63.

National Center for Injury Prevention and Control, C. f. D. C. a. P. (2010, March 4, 2010). Web-based Injury Statistics Query and Reporting System.   Retrieved Nov 1, 2010, from http://www.cdc.gov/injury/wisqars/index.html

Newton, A. S., Zou, B., Hamm, M. P., Curran, J., Gupta, S., Dumonceaux, C., et al. (2010). Improving child protection in the emergency department: a systematic review of professional interventions for health care providers. *Acad Emerg Med, 17*(2), 117-125.

Nrugham, L., Larsson, B., & Sund, A. M. (2008a). Predictors of suicidal acts across adolescence: influences of familial, peer and individual factors. *J Affect Disord, 109*(1-2), 35-45.

Nrugham, L., Larsson, B., & Sund, A. M. (2008b). Specific depressive symptoms and disorders as associates and predictors of suicidal acts across adolescence. *J Affect Disord, 111*(1), 83-93.

O'Donnell, L., Stueve, A., & Wilson-Simmons, R. (2005). Aggressive behaviors in early adolescence and subsequent suicidality among urban youths. *J Adolesc Health, 37*(6), 517.

O'Neill, K., Horowitz, L. M., Smith, M. F., Levin, C., & Klavon, S. (2001). Recognizing suicide risk in a pediatric emergency department: a change in nursing care. *Pediatr Emerg Care, 17*(4), 306-309.

Paulson, M. J., Stone, D., & Sposto, R. (1978). Suicide potential and behavior in children ages 4 to 12. *Suicide Life Threat Behav, 8*(4), 225-242.

Pena, J. B., & Caine, E. D. (2006). Screening as an approach for adolescent suicide prevention. *Suicide Life Threat Behav, 36*(6), 614-637.

Peng, C.-Y., J, Nicols, R.N. (2003). Using Multinomial Logistic Models to Predict Adolescent Behavioral Risk. *Journal of Modern Applied Statistical Methods, 2*(1), 177-188.

Perez-Smith, A., Spirito, A., & Boergers, J. (2002). Neighborhood predictors of hopelessness among adolescent suicide attempters: preliminary investigation. *Suicide Life Threat Behav, 32*(2), 139-145.

Pfeffer, C. R. (2001). Diagnosis of childhood and adolescent suicidal behavior: unmet needs for suicide prevention. *Biol Psychiatry, 49*(12), 1055-1061.

Pfeffer, C. R., Klerman, G. L., Hurt, S. W., Kakuma, T., Peskin, J. R., & Siefker, C. A. (1993). Suicidal children grow up: rates and psychosocial risk factors for suicide attempts during follow-up. *J Am Acad Child Adolesc Psychiatry, 32*(1), 106-113.

Pilowsky, D. J., & Wu, L. T. (2006). Psychiatric symptoms and substance use disorders in a nationally representative sample of American adolescents involved with foster care. *J Adolesc Health, 38*(4), 351-358.

Plunkett, A., O'Toole, B., Swanston, H., Oates, R. K., Shrimpton, S., & Parkinson, P. (2001). Suicide risk following child sexual abuse. *Ambul Pediatr, 1*(5), 262-266.

Prigerson, H. G., & Slimack, M. J. (1999). Gender differences in clinical correlates of suicidality among young adults. *J Nerv Ment Dis, 187*(1), 23-31.

Purselle, D. C., Heninger, M., Hanzlick, R., & Garlow, S. J. (2009). Differential association of socioeconomic status in ethnic and age-defined suicides. *Psychiatry Res, 167*(3), 258-265.

Renaud, J., Berlim, M. T., McGirr, A., Tousignant, M., & Turecki, G. (2008). Current psychiatric morbidity, aggression/impulsivity, and personality dimensions in child and adolescent suicide: a case-control study. *J Affect Disord, 105*(1-3), 221-228.

Reynolds, W. (1987). *Suicidal Ideation Questionnaire*. Odessa, FL: Psychological Assessment Resources.

Rickwood, D. J., & Braithwaite, V. A. (1994). Social-psychological factors affecting help-seeking for emotional problems. *Soc Sci Med, 39*(4), 563-572.

Rotheram-Borus, M. J., Piacentini, J., Cantwell, C., Belin, T. R., & Song, J. (2000). The 18-month impact of an emergency room intervention for adolescent female suicide attempters. *J Consult Clin Psychol, 68*(6), 1081-1093.

Rotheram-Borus, M. J., Piacentini, J., Miller, S., Graae, F., & Castro-Blanco, D. (1994). Brief cognitive-behavioral treatment for adolescent suicide attempters and their families. *J Am Acad Child Adolesc Psychiatry, 33*(4), 508-517.

Roy, A. (2004). Relationship of childhood trauma to age of first suicide attempt and number of attempts in substance dependent patients. *Acta Psychiatr Scand, 109*(2), 121-125.

Rudd, M. D., Berman, A. L., Joiner, T. E., Jr., Nock, M. K., Silverman, M. M., Mandrusiak, M., et al. (2006). Warning signs for suicide: theory, research, and clinical applications. *Suicide Life Threat Behav, 36*(3), 255-262.

Saunders, S. M., Resnick, M. D., Hoberman, H. M., & Blum, R. W. (1994). Formal help-seeking behavior of adolescents identifying themselves as having mental health problems. *J Am Acad Child Adolesc Psychiatry, 33*(5), 718-728.

Schwartz, K. A., Pyle, S. A., Dowd, M. D., & Sheehan, K. (2010). Attitudes and beliefs of adolescents and parents regarding adolescent suicide. *Pediatrics, 125*(2), 221-227.

Shaffer, D., Gould, M. S., Fisher, P., Trautman, P., Moreau, D., Kleinman, M., et al. (1996). Psychiatric diagnosis in child and adolescent suicide. *Arch Gen Psychiatry, 53*(4), 339-348.

Spann, M., Molock, S. D., Barksdale, C., Matlin, S., & Puri, R. (2006). Suicide and African American teenagers: risk factors and coping mechanisms. *Suicide Life Threat Behav, 36*(5), 553-568.

Spirito, A., Boergers, J., Donaldson, D., Bishop, D., & Lewander, W. (2002). An intervention trial to improve adherence to community treatment by adolescents after a suicide attempt. *J Am Acad Child Adolesc Psychiatry, 41*(4), 435-442.

Stanley, B., Brown, G., Brent, D., Wells, K., Poling, K., Curry, J., et al. (2009). Cognitive-Behavioral Therapy for Suicide Prevention (CBT-SP): Treatment Model, Feasibility, and Acceptability. *J Am Acad Child Adolesc Psychiatry*.

Stein, D. J., Chiu, W. T., Hwang, I., Kessler, R. C., Sampson, N., Alonso, J., et al. (2010). Cross-national analysis of the associations between traumatic events and suicidal behavior: findings from the WHO World Mental Health Surveys. *PLoS One, 5*(5), e10574.

Suominen, K., Isometsa, E., Martunnen, M., Ostamo, A., & Lonnqvist, J. (2004). Health care contacts before and after attempted suicide among adolescent and young adult versus older suicide attempters. *Psychol Med, 34*(2), 313-321.

Tishler, C. L., Reiss, N. S., & Rhodes, A. R. (2007). Suicidal behavior in children younger than twelve: a diagnostic challenge for emergency department personnel. *Acad Emerg Med, 14*(9), 810-818.

Vinnerljung, B., Hjern, A., & Lindblad, F. (2006). Suicide attempts and severe psychiatric morbidity among former child welfare clients--a national cohort study. *J Child Psychol Psychiatry, 47*(7), 723-733.

Wagner, B. (2009). *Suicidal Behavior in Children and Adolescents*. New Haven Yale University Press.

Weismoore, J. T., & Esposito-Smythers, C. (2010). The role of cognitive distortion in the relationship between abuse, assault, and non-suicidal self-injury. *J Youth Adolesc, 39*(3), 281-290.

Wu, P., Katic, B. J., Liu, X., Fan, B., & Fuller, C. J. (2010). Mental health service use among suicidal adolescents: findings from a U.S. national community survey. *Psychiatr Serv, 61*(1), 17-24.

Wyman, P. A., Gaudieri, P. A., Schmeelk-Cone, K., Cross, W., Brown, C. H., Sworts, L., et al. (2009). Emotional triggers and psychopathology associated with suicidal ideation in urban children with elevated aggressive-disruptive behavior. *J Abnorm Child Psychol, 37*(7), 917-928.