SERVICE UTILIZATION AMONG ADOLESCENTS FROM RACIAL AND ETHNIC MINORITY GROUPS WITH ELEVATED SUICIDE RISK: EXPLORING THE ROLES OF TRAUMA EXPOSURE AND RELATED SYMPTOMOLOGY

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A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Nursing Science in the School of Nursing.

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ABSTRACT

Lilian Guadalupe Bravo: Service Utilization Among Adolescents from Racial and Ethnic Minority Groups with Elevated Suicide Risk: Exploring the Roles of Trauma Exposure and Related Symptomology
(Under the direction of Cheryl Woods-Giscombe)

Background: Suicide is the second leading cause of death among adolescents in the United States. Among adolescents from a racial and ethnic minority group, rates of suicide attempts increased over the past decade. Early detection of suicide risk is complicated by low rates of mental health service utilization among adolescents from racial and ethnic minority groups who present with self-harm types (i.e., suicidal ideation, attempts, non-suicidal self-injury). Characterization of and identification of factors associated to utilization have been under-investigated.

Method: A descriptive, three-paper dissertation guided by Andersen’s behavioral model of health service utilization for vulnerable populations was completed. Paper one is a scoping review synthesizing empirical literature on service utilization characteristics and factors associated with utilization for adolescents from racial and ethnic minority groups with a self-harm type. Paper two is a cross-sectional, secondary analysis using the National Child Traumatic Stress Network’s (NCTSN) Core Data Set (CDS), examining the role of self-harm, race, ethnicity, and gender on service utilization characteristics among a trauma-exposed, treatment-seeking adolescent sample. Utilizing the subsample who reported self-harm types, paper three includes an investigation of trauma-related pathways to service utilization within racial and ethnic groups.
Results: NH White adolescents utilized services with greater frequency compared to Black adolescents. Black adolescents who had histories of self-harm were not more likely to receive mental health services than other Black adolescents. Medical healthcare services were more likely to be accessed among all racial and ethnic groups presenting with self-harm. Factors associated to service utilization were significantly different across groups. Hispanic and NH White adolescents had psychiatric symptoms (e.g., externalizing, hyperarousal) associate with service utilization. For NH Black adolescents, symptoms were not associated with service utilization. However, trauma exposure was associated with service utilization across all groups.

Conclusion: Trauma exposure assessment may facilitate access to services among adolescents at risk for suicide, particularly those from racial and ethnic minority groups. While the identification of individual-level factors such as trauma exposure are necessary for referral to services, future research should focus on identifying structural and culture-specific factors associated with service utilization.
To my sister Anette,
My inspiration for all I do.
I am thankful every day for your warm presence and youthful wisdom.
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We also acknowledge the 56 sites within the NCTSN that have contributed data to the Core Data Set as well as the children and families that have contributed to our growing understanding of child traumatic stress. This dissertation study was developed (in part) under grant numbers 1U79SM062976 from the Center for Mental Health Services (CMHS), Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services (HHS). The views, policies, and opinions expressed are those of the authors and do not necessarily reflect those of SAMHSA or HHS.
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<th>Description</th>
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<tr>
<td>AAPI</td>
<td>Asian Americans and Pacific Islanders</td>
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<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
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<tr>
<td>CBCL</td>
<td>Child Behavior Checklist</td>
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<td>CDC</td>
<td>Center for Disease Control</td>
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<tr>
<td>CDS</td>
<td>Core Data Set</td>
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<tr>
<td>IOS</td>
<td>Indicators of Severity</td>
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<td>IRB</td>
<td>Institutional Review Board</td>
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<tr>
<td>DSM</td>
<td>Diagnostic and Statistical Manual of Mental Disorders</td>
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<tr>
<td>NCTSN</td>
<td>National Child Traumatic Stress Network</td>
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<tr>
<td>NH</td>
<td>Non-Hispanic</td>
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<td>NSSI</td>
<td>Non-suicidal self-injury</td>
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<tr>
<td>PRISMA-Scr</td>
<td>Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Reviews</td>
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<tr>
<td>PTSD</td>
<td>Post-traumatic stress disorder</td>
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<tr>
<td>UCLA PTSD-RI</td>
<td>UCLA Child/Adolescent Posttraumatic Stress Disorder Reaction Index</td>
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<tr>
<td>SA</td>
<td>Suicide attempt</td>
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<tr>
<td>SI</td>
<td>Suicidal ideation</td>
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<tr>
<td>SIB</td>
<td>Self-injurious behaviors</td>
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<tr>
<td>SEM</td>
<td>Structural equation modeling</td>
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<td>SH</td>
<td>Self-harm</td>
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<td>THP</td>
<td>Trauma History Profile</td>
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<tr>
<td>UNC</td>
<td>University of North Carolina at Chapel Hill</td>
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<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>YRBSSR</td>
<td>Youth Risk Behavior Surveillance System Report</td>
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CHAPTER 1: SERVICE UTILIZATION AMONG ADOLESCENTS FROM RACIAL AND ETHNIC MINORITY GROUPS PRESENTING WITH SELF-HARM TYPES

Introduction

Suicide is the second leading cause of death among adolescents (Curtin & Heron, 2019) in the United States (U.S.). Adolescents from racial and ethnic minority groups1, such as Black (Ivey-Stephenson, 2020; Price & Khubchandani, 2019; Yen et al., 2013) and Hispanic2 (regardless of race) adolescents have disproportionately higher rates of suicide attempts and related deaths (Ivey-Stephenson, 2020; Khan et al., 2018; Price & Khubchandani, 2017) compared to non-Hispanic (NH) White. According to the CDC’s 2019 Youth Risk Behavior Surveillance System Report (YRBSSR), Black and Hispanic adolescents attempted suicide at significantly higher rates (NH White: 7.9%; Hispanic: 8.9%; NH Black: 11.8%) in the past 12 months (Ivey-Stephenson et al., 2020). For the brief literature review in this chapter, special attention is given to the experiences of NH Black and Hispanic adolescents as they are the focus for Chapters 3-4.

Adolescents from racial and ethnic minority groups utilize mental health services at lower rates compared to NH White adolescents, despite equal or greater unmet mental health needs (Freedenthal, 2007; Lopez et al., 2008; Marrast et al., 2016; Zimmerman, 2005). Gaps in mental

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1 Referring to individuals from racial and ethnic minority groups in the US, specifically, Asian, Native Hawaiians, Pacific Islanders, Native American/American Indian, Black/African American, and Hispanic.

2 The terms Hispanic (i.e., of a Spanish-speaking country) and Latino/a/x (e.g., of Latin American descent) are used throughout. The terms are not necessarily interchangeable but utilize both in this dissertation to reflect the term authors utilized in each study (Chapter 2) and what was used in the demographic data collection tool (Hispanic; Chapter 3 and 4).
health service utilization among racial and ethnic minority adolescents may be due to (a) health system-level factors, such as availability of culturally sensitive screening assessments and treatments (de Arellano et al., 2018; Mizock & Harkins, 2011; Tucker et al., 2007), (b) community level barriers, such as stigma associated with mental illness (DuPont-Reyes et al., 2019), and (c) personal and family level barriers such as health insurance coverage (Chang & Biegel, 2018), differences between adolescents and parents’ perceived need for treatment (Williams et al., 2011) and parental expectations for treatment outcomes (Chapman & Stein, 2014). Multiple barriers faced by minority adolescents may result in fewer/reduced/decreased opportunities for identification and treatment of mental health symptoms prior to a suicide attempt. Lack of access to preventative services may contribute to the elevated rate of suicide attempts among adolescents from racial and ethnic minority groups.

Research examining what factors inform service utilization among adolescents from racial and ethnic minority groups who report self-harm types is limited. Most existing research has examined service utilization for self-harm types for across or between racial and ethnic group (Husky et al., 2012; Nestor et al., 2016), which may obscure within racial and ethnic group factors that may contribute to differential service utilization patterns. Additionally, service utilization characteristics have largely focused on mental health and general healthcare service sectors, such as primary care clinics, community health centers, and hospitals (Michelmore & Hindley 2012), which may not comprehensively capture the service sectors adolescents from racial and ethnic minority groups may interact with when addressing self-harm types (e.g., juvenile justice system, social services).

Two objectives of the National Action Alliance for Suicide Prevention’s National Strategy for Prevention include 1) increasing integration of preventative services across sectors
(e.g., healthcare, school, social services) and 2) promoting access to assessment and tailored treatment strategies for individuals with increased risk for suicide (National Action Alliance for Suicide Prevention, n.d.). This dissertation aims to clarify where racial and ethnic adolescents with increased risk for suicide access a wide-range of services, such as general healthcare, mental healthcare, school-based services, and spiritual services (Chapter 2). This dissertation then utilizes a national dataset to examine factors that influence service utilization among NH Black and Hispanic adolescents who are at increased risk for suicide (Chapter 3 and 4).

This chapter provides (a) definitions for variables of interest (self-harm types, trauma exposure, service utilization); (b) a brief literature review to establish the premise for Chapters 2-4; (c) an overview of Andersen’s Behavioral Model of Health Service Utilization for Vulnerable Populations, the theoretical model guiding this dissertation; (c) a description of all study aims; and (d) an overview for Chapters 2-5.

**Definitions for Variables of Interests**

**Self-Harm Types: Suicidality and Non-Suicidal Self-Injury**

Suicidality (Franklin JC, 2017), and non-suicidal self-injury (NSSI: Nock et al., 2006) are prominent indicators for future suicide attempts among adolescents (Franklin JC, 2017; Hughes et al., 2017; Joiner et al., 2012; Nock et al., 2006). Suicidality is defined as suicidal behaviors, attempts, and ideations (Posner et al., 2007). NSSI is defined as the “deliberate destruction of one’s body tissue in the absence of suicidal intent (Nock, 2009). The term ‘self-harm types’ will be used to refer to the presence of suicidality and/or NSSI as defined above. We utilize a broad operationalization of self-harm types, as both inform suicide risk, albeit to varying degrees. Within this dissertation, self-harm will be utilized to refer interchangeably with the term self-harm types.
Trauma Exposures: Definitions and Distinctions Between Other Stressors

According to the DSM-5 (APA, 2013), a traumatic event experience is part of Criterion A for the diagnosis of post-traumatic stress disorder (PTSD) and defined as “exposure to actual or threatened death, serious injury or sexual violence” (APA, 2013). Similarly, the National Child Traumatic Stress Network (NCTSN) defines a childhood traumatic event as a “frightening, dangerous, or violent event that poses a threat to a child’s life or bodily integrity” (NCTSN, n.d.). A few examples of traumatic events include the loss of a family member or being sexually assaulted (APA, 2013). Distinct from instances of everyday stress, trauma experiences are extremely stressful experiences that result in actual or perceived threat to the person’s wellbeing. Thus, while trauma is a specific type of stress experience, the two terms are not interchangeable. Within this dissertation document, the term “trauma exposure” refers to traumatic or potentially traumatic experiences (vicarious or witnessed). This dissertation study includes 20 different types of trauma exposures, including but not limited to, sexual, physical, and emotional abuse, neglect, interpersonal violence exposures, natural disasters, and kidnapping. Refer to Appendix B for a full list of trauma exposures.

Service Utilization Characteristics

Health care use is defined as accessing a service sector for the delivery of health treatment and/or services in relation to one’s condition (Donabedian, 1973). Within this dissertation study, “service utilization” is a broader term used to encompass any type of service in relation to seeking help while presenting with specific self-harm types. Service sector use refers to the system in which an adolescent accessed service(s), and includes juvenile justice facilities, social services, school-based services, healthcare (general), and mental healthcare (specialty) services. The term “intensity of the services used” refers to elements of the service high psychiatric need and/or crisis-oriented care.
Background

Suicide Risk Among Black and Hispanic Adolescents

According to the CDC’s 2019 YRBSSR, Black and Hispanic adolescents attempted suicide at significantly higher rates (NH White 7.9%, Hispanic: 8.9%, NH Black: 11.8%) in the past 12 months Suicide attempt rates among Hispanic adolescents consistently trended higher than those of NH White and Black adolescents between 1991 and 2015 (Kann et al., 2016). Suicide attempts among Black adolescents have risen by 73% between the years 1991 to 2017 (Prevention, 2018) and recently surpassed suicide attempt rates of Hispanic and NH White adolescents (Ivey-Stephenson, 2020). Furthermore, although NSSI rates among Black and Hispanic adolescents are generally lower than those of NH White adolescents, risk for subsequent morbidity is higher among these groups. A heightened risk of morbidity among racial and ethnic minority adolescents at risk for suicide may be attributable to factors such as limited access and referral to mental health services (Ahmedani et al., 2015; Bridges et al., 2010; Rastogi et al., 2012; Wu et al., 2010). According to the National Center for Injury Prevention and Control’s Web-based Injury Statistics Query and Reporting System, suicide was the leading cause of death for Native American/Alaskan Native and Asian/Pacific Islander adolescents from 2015 to 2020 (CDC, 2020). To reduce the development of suicide risk, a need exists for establishing suicide risk identification and treatment strategies specifically for adolescents from racial and ethnic minority groups.

Health Service Utilization for Suicide Risk Among Adolescents from Racial and Ethnic Minority Groups

Understanding patterns of service utilization and types of health services used for self-harm types is complicated by low baseline rates of mental health service utilization among adolescents from racial and ethnic minority groups (Alegria et al., 2010; Freedenthal, 2007;
Nestor et al., 2016). Many individuals who report suicidality also have low health services engagement, which may be due to factors such as fear of hospitalization, no perceived need, or low or no insurance coverage (Hom et al., 2015). A review on help-seeking behaviors among adolescents and young adults who report self-harm identified that individuals who identified as an ethnic minority were less likely to seek professional services (Michelmore & Hindley, 2012). Despite differences in service utilization characteristics between diverse racial and ethnic groups, few studies have explored or clarified service utilization patterns among racial and ethnic adolescents who report self-harm types (Ahmedani et al., 2015; Freedenthal, 2007; Nestor et al., 2016; Wu et al., 2010).

Existing studies reveal NH White adolescents are the most likely from all racial and ethnic adolescent groups to complete a healthcare visit, such as a primary care or mental health clinic, before a suicide attempt (King et al., 2020). NW White adolescents are more likely to present at healthcare settings with less severe suicidality symptoms (e.g., ideations and attempts) compared to NH Black adolescents (King et al., 2020; Nestor et al., 2016). In a retrospective study, Black and Hispanic adolescents were less likely to have received any mental health services in the same year they had severe presentations, such as attempted suicide, compared to NH White adolescents (Freedenthal, 2007). Thus, an opportunity for identification and assessment occurred for NH White adolescents at higher rates compared to Hispanic and NH Black adolescents, regardless of elevated mental health symptoms (Freedenthal, 2007; Wu et al., 2010).

Little is known about the characteristics of service utilization among NH Black and Hispanic adolescents, such as which service sectors are accessed (e.g., social services, juvenile justice, healthcare) and whether these are intensive services where adolescents who present with
self-harm types encounter healthcare providers (Aalsma et al., 2015; Rawal et al., 2004). For example, NH Black adolescents presenting with suicidality had lower rates of non-intensive preventative service utilization, such as outpatient psychotherapy, compared to their NH White adolescent peers (Nestor et al., 2016). Studies that have examined service characteristics by sector used found that racial and ethnic differences in service utilization were present within the mental healthcare sector, such that Black and Hispanic adolescents had lower utilization of specialty mental health services (Freedenthal 2007; Wu et al., 2010).

Both the sector and intensity of services received are important factors to evaluate. For the intensity of services, one study reported statistically significant lower likelihood in service utilization for suicidality among NH Black compared to NH White adolescents for outpatient (e.g., non-intensive) mental health service categories, but did not report a lower likelihood for accessing inpatient treatment (e.g., residential treatment; Nestor et al., 2016) services. One study examined specifically for sector-specific service utilization, namely school-based services; results indicated racial and ethnic differences in health service utilization were smaller in magnitude within the school-based services for adolescents with suicide risk (Wu et al., 2010). This may be indicative of a larger trend in health care use among adolescents from racial and ethnic minority groups, where non-specialty health services may be more accessible and/or acceptable compared to specialized mental health care services (Alegria et al., 2002; Wang et al., 2006).

**Relationships Among Trauma Exposure, Trauma-Related Symptoms, and Self-Harm Types**

Childhood trauma exposures (Beristianos et al., 2016; Castellví et al., 2017; Ford & Gómez, 2015; Liu et al., 2018) are risk factors for the development of self-harm types. A recent meta-analysis examined the relationship between interpersonal violence (e.g., childhood
maltreatment, bullying, dating violence, community violence) and subsequent development of suicide attempts and suicide completion and found that youth and young adults (12-26 years old) who experienced interpersonal violence had a 10 times higher risk for suicide (Castellví et al., 2017). Previous experiences of childhood maltreatment (e.g., sexual abuse, physical, emotional abuse/neglect) were also associated with increased odds of NSSI (Liu et al., 2018). Thus, childhood traumas contribute significantly to the development of self-harm types.

Posttraumatic stress symptoms often co-occur with self-harm behaviors (Ford & Gómez, 2015) and present differently across racial and ethnic groups (López et al., 2017). For example, reexperiencing/intrusion symptoms and avoidance/numbing have been associated with self-harm behaviors (i.e. NSSI; suicidal ideation). Specifically, the individual may engage in self-harm to detach from negative thoughts (Weierich & Nock 2008; Lopez et al., 2020). Hyperarousal symptoms are also associated with suicidal ideation among adolescents (Ying et al., 2015). Among Black and Hispanic adolescents, the presentation profile of symptoms following a trauma may differ. For example, Black and Hispanic youth report more depressive (Andrews et al., 2015) and posttraumatic stress disorder (PTSD) symptoms (López et al., 2017) in response to trauma exposure compared to NH White youth. Among Black adolescents exposed to community violence, posttraumatic stress responses such as numbing and hyperarousal, have also been associated with the development of depressive symptoms (Kohl et al., 2015). Among Hispanic youth, studies have demonstrated that dissociation symptoms are associated with trauma experiences (Vásquez et al., 2012) and suicidal behaviors (Zayas & Gulbas, 2012; Zayas et al., 2005). Thus, trauma exposure and related symptoms may present differently alongside self-harm types within Black and Hispanic adolescents and can inform referral to services.
Assessment of trauma exposures and related symptoms may improve the identification of adolescents at risk for suicide and facilitate health service utilization.

**Exploring Trauma Exposure and Related Symptoms in Relation to Service Utilization**

The specific factors that may inform service utilization within adolescents from racial and ethnic minority groups who present with self-harm behaviors are largely unknown. Existing literature indicates that trauma exposure and PTSD symptoms are associated with self-harm types and thus, may be important factors to examine in relation to health service utilization for adolescents who self-harm. Some studies suggest trauma exposure is associated with accessing services among the general adult population (Kartha et al., 2008) and adolescents (Briggs et al., 2013; Ystgaard et al., 2009). Another study found adolescents with a PTSD diagnosis access a high level of health services (Goger et al., 2021).

Identifying if trauma-related characteristics (e.g., trauma history, related symptoms) inform use of services may improve trauma-informed assessment efforts to prevent suicide among adolescents. Moreover, examining within racial and ethnic group differences is necessary to advance the development of targeted strategies to improve access to care among at-risk populations.

No studies to date have examined trauma exposure and PTSD symptoms as factors associated with service utilization among Black and Hispanic adolescents presenting with self-harm types. This is a concerning gap in the literature, considering childhood trauma exposures significantly predict future self-harm types and suicide risk (Castellví et al., 2017). Additionally, Black and Hispanic adolescents are at increased risk for trauma exposure with reports of disproportionately higher rates of multiple trauma exposures (Andrews et al., 2019; López et al., 2017), greater exposures to race and ethnicity-based trauma (e.g., discrimination; Tynes et al., 2019) and community violence (Graham-Bermann et al., 2006; Roberts et al., 2011; Spinazzola
et al., 2018) compared to NH White adolescents. As a result of the heightened risk for trauma exposure, Black and Hispanic adolescents may also be more likely to experience a range of PTSD symptoms (Loyd et al., 2019; Perreira & Ornelas, 2013). Which symptom clusters are most prevalent and salient to address may also differ by race/ethnicity. For example, some Black male adolescents may live in environments where PTSD symptoms such as hypervigilance may be adaptive for the prevention of further trauma exposure (Smith & Patton 2016; Phan et al., 2020). Hypervigilance may contribute to and reinforce self-harm types (Castellvi et al., 2017; Liu et al., 2018), which, in turn, can increase suicide risk. Coupled with low service utilization among Black and Hispanic adolescents who present with self-harm types, examining service utilization characteristics and exploring within-group trauma-related factors that influence service utilization is a priority for reducing suicide rates among adolescents in the U.S.

**Theoretical Background**

Andersen’s Behavioral Model of Health Service Utilization for Vulnerable Populations (Andersen, 1995; Gelberg et al., 2000; von Lengerke et al., 2014) serves as the guiding framework for this dissertation study. This model has been previously utilized to understand predisposing, enabling, and need factors associated with health service utilization among adolescents at risk for suicide (Alonzo et al., 2016; Goldston et al., 2003; LeCloux et al., 2017) and is useful for examining these factors at multiple levels (Figure 1.1). Predisposing factors can be defined as social, cultural, and environmental level factors, including variables such as demographics, acculturation status, and childhood characteristics, which inform service utilization directly and indirectly through enabling and need factors. Enabling factors are defined as resources for accessing services, such as social support and insurance status. Need factors include characteristics of the individual’s health needs, both perceived and evaluated, such as self-harm types and psychiatric co-morbidities.
Factors such as parental support, insurance status (LeCloux et al., 2017), and psychiatric co-morbidity (Alonzo et al., 2016; Nestor et al., 2016) are indicators of accessing and utilizing health services among adolescents with risk for suicide. One study among Hispanic adolescents reporting suicidality found need factors, such as inattention and mood fluctuations, were associated with an increased likelihood of accessing mental health services (Alonzo et al., 2016). Less attention has been given to trauma-related factors, such as cumulative trauma exposure (predisposing) and PTSD symptoms (need), which may inform service utilization according to Andersen’s model (Chapter 4).

Overall, Andersen’s Behavioral Model of Health Service Utilization for Vulnerable Populations will be utilized for all dissertation aims to frame the research questions and organize the findings as they relate to factors associated with service utilization for racial ethnic minority adolescents (Chapter 2) and more specifically Black and Hispanic adolescents (Chapter 3 and 4). For Chapter 2, the application of Andersen’s model will be utilized to guide the extraction and synthesis of previously documented factors related to service utilization (Figure 1.1). For Chapters 3 and 4, Andersen’s model provides a framework for addressing service utilization of trauma-exposed adolescents presenting with self-harm types and PTSD symptoms. In Figure 1.2,
the adaptation of Andersen’s model will guide investigation of factors such as trauma history (*predisposing*) and posttraumatic stress symptoms (*need*) inform service utilization of adolescents. Additional factors such as insurance status (*enabling*) and gender (*predisposing*) are also included.

**Figure 1.2. Andersen’s Model: Factors and Associations Tested in Chapter 3 and 4**

**Aims**

The overall purpose of this dissertation was to describe service utilization and identify factors related to service utilization among adolescents from racial and ethnic minority groups who report self-harm types by achieving the following aims:

1) Synthesize the literature on service utilization characteristics and factors associated with utilization for racially and ethnically diverse adolescents groups who report self-harm types.

2) Examine the role of self-harm types, race, ethnicity, and gender and its association with service utilization characteristics for trauma-exposed and treatment-seeking adolescents.

3) Explore and test paths between trauma-related factors and services used across and within racial and ethnic groups specifically for adolescents who report self-harm types.
Summary of Chapters 2-5

In this dissertation, we examine trauma-related factors (i.e. exposure and symptoms) and their association to service utilization within a sample of adolescents who present with self-harm types. We contribute to the limited literature on differences between and within diverse racial and ethnic groups on service utilization for adolescents who present with self-harm types. Chapters 2, 3, and 4 correspond with the three aims of this dissertation.

Chapter 2: “Service utilization characteristics and correlates for self-harm types among adolescents from racial and ethnic minority groups: a scoping review” (Aim 1)

Chapter 2 is a scoping review to assess the current state of the science regarding factors associated with service utilization among adolescents from racial and ethnic minority groups who report self-harm types. Specifically, this review will provide a synthesis of (a) factors associated with utilizing services and (b) service utilization sectors and types accessed among adolescents from racial and ethnic minority groups who present with self-harm types. This review was guided by Andersen’s Behavioral Model of Health Service utilization to identify and extract the predisposing, enabling, and need factors for service utilization (Andersen, 1995).

Chapter 3: “Racial, ethnic, and gender disparities in service utilization among adolescents with elevated risk for self-harm” (Aim 2)

The purpose of Chapter 3 is to examine the role between race/ethnicity, gender, and self-harm on number of services, intensity of services, and service sectors used. The design for this study is a cross-sectional secondary data analyses utilizing the National Child Traumatic Stress Network (NCTSN) Core Data Set (CDS). The sample consisted of trauma-exposed, treatment-seeking adolescents who had available data for variables of interest (N=4,980). Interaction effects of race/ethnicity, gender, and self-harm services use characteristics were examined through a series of mixed effects logistic and negative binomial regression models. This
information can contribute to identification of where adolescents at risk for self-harm types receive services. This can later inform where programming to ensure receipt of services and engagement in care can be implemented.

Chapter 4: “Trauma-related factors associated with service utilization for adolescents reporting self-harm” (Aim 3)

In Chapter 4, pathways between trauma exposure, posttraumatic stress symptoms, and service utilization were examined specifically for adolescents who report self-harm types. More specifically, we examined these paths for the overall sample and within racial and ethnic group (NH White, NH Black and Hispanic). This is a descriptive study using cross-sectional, baseline data from the NCTSN CDS with a sample of adolescents (12-17) who report self-harm ($N=1578$). An adapted version of Andersen’s behavioral model of health service utilization was used to test the paths between trauma-related factors (predisposing, enabling, need) and services used. This information can contribute to development of trauma-informed interventions to ensure that youths at risk for self-harm, receive services that facilitate symptom stabilization and recovery.

Chapter 5: Discussion and Conclusion

Chapter 5 provides an overall summary, a brief discussion for the results in chapters 2-4, strengths and limitations of the overall dissertation study, and implications for future research and clinical practice.
REFERENCES


CHAPTER 2: SERVICE UTILIZATION CHARACTERISTICS AND CORRELATES FOR SELF-HARM TYPES AMONG ADOLESCENTS FROM RACIAL AND ETHNIC MINORITY GROUPS: A SCOPING REVIEW

Introduction

Health service access and receipt of mental health care services are consistently lower among racial and ethnic minority adolescents compared to Non-Hispanic (NH) White adolescents despite greater or equal unmet mental health symptoms in need of assessment and treatment (Alegria et al., 2010; Lu et al., 2021). This is especially concerning in light of higher prevalence rates for self-harm types among adolescents from racial and ethnic minority groups, compared to NH White adolescents. For example, NH Black adolescents suicide attempt rates increased from 7.9 to 11.8% (2009 to 2019), Hispanic adolescent suicide attempt rates have remained elevated from 2009 to 2019 (8.1 to 8.9%), and both have higher rates compared to NH White adolescents for 2019 (7.9%; Ivey-Stephenson et al., 2020). For Native American/Alaskan Native and Asian/Pacific Islander adolescents, suicide has been identified as the leading cause of death (CDC, 2020). Low service utilization rates are also documented among adolescents presenting with self-harm types (Husky et al., 2012; Michelmore & Hindley, 2012). In a review examining help-seeking behaviors among young people who self-harm, ethnicity was identified as a factor related to lower likelihood of seeking formal mental health services (Michelmore & Hindley, 2012). Thus, adolescents from racial and ethnic minority groups may be at higher risk for experiencing self-harm types and less likely to receive treatment (Alegria et al., 2010;

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3 Referring to individuals from racial and ethnic minority groups in the US, specifically, Asian, Native Hawaiians, Pacific Islanders, Native American/American Indian, Black/African American, and Hispanic.
Goldston et al., 2008). To obtain a more thorough understanding of the current state of the science on service utilization among self-harm reporting adolescents from racial and ethnic minority groups, we conducted a scoping review to identify (a) factors associated with utilizing services and (b) service utilization characteristics, such as sectors and types (including, but not limited to, healthcare-specific services).

**Background**

In general, low mental health service utilization rates among adolescents from racial and ethnic minority groups creates a challenge related to identifying particular characteristics of service utilization for mental health concerns (Alegria et al., 2010). A previous overview of the literature describing racial and ethnic disparities in mental healthcare for youth found that barriers at the person/family level such as cultural beliefs regarding mental health, as well as structural barriers such as financial resources and insurance, impeded mental health service access for racial and ethnic minority youth (Alegria et al., 2010). Another recent review identified barriers to mental health service utilization for adolescents from racial and ethnic minority groups, including fear of parents knowing about their mental health concerns, self-perceived stigma, parent/child conflict, and low parent education levels (Lu et al., 2021). Further, once adolescents access care, they may face additional challenges such as communication barriers, including a lack of language interpreters (Alegria et al., 2010).

For adolescents with self-harm types, service utilization rates are low across racial and ethnic groups. For example, in a sample of adolescents who attempted suicide, only 56.7% were able to access mental health services in the past 12 months (Husky et al., 2012). Adolescents with self-harm types encounter barriers similar to those of adolescents from racial and ethnic minority groups described above, in addition to unique factors related to their self-harm presentation. For example, a review examining factors related to help-seeking among young
people with self-harm types reported factors such as the tendency to perceive their self-harm as non-severe and self-reliance as barriers to seeking formal services (Michelmore & Hindley, 2012). Thus, adolescents from racial and ethnic minority groups seeking care for self-harm types may experience additional barriers to receiving care by the nature of their presenting mental health concerns. In light of persistent and increasing rates of self-harm types, such as suicide attempts in racial and ethnic minority communities, it is important to identify factors that influence service utilization and prompt diagnosis and referral.

A previous systematic review examined help-seeking for self-harm types among all adolescents and young adults without attention to between and within group race or ethnicity differences (Michelmore & Hindley, 2012). This review only identified ethnicity as a variable associated with not seeking professional services (Michelmore & Hindley, 2012), with no within group examination of why adolescents from racial and ethnic minority groups did not seek services. Another review was published in 2008 that examined cultural considerations for treating adolescents from racial and ethnic minority groups at risk for suicide. This review reported factors such as lack of familiarity with the healthcare system for first-generation adolescents and their families, stigma associated with mental health services, and preference for spiritual services and traditional healing rituals as possible reasons for lack of mental health service utilization among adolescents from racial and ethnic minority groups who are experiencing suicidality (Goldston et al., 2008). However, this review did not include systematic or scoping review guidelines in its methodology. Other reviews have aimed to investigate mental health service utilization among racial and ethnic minority pediatric populations, spanning children and adolescents, (Alegria et al., 2010) or to depict mental health service utilization barriers and facilitators among adolescents from racial and ethnic minority groups (Lu et al.,
without a focus on self-harm types. No systematic reviews have focused on describing service utilization patterns specifically among adolescents from racial and ethnic minority groups who report suicidality or who present with non-suicidal self-injury (NSSI). There is a need for a systematic synthesis of factors related to the service utilization for self-harm types among adolescents from racial and ethnic minority groups, given the unique, often stigmatized nature of reporting self-harm types in racial and ethnic minority communities (Campbell & Mowbray, 2016; Goldston et al., 2008). Synthesizing the literature addressing service utilization characteristics, as well as factors contributing to service utilization for adolescents from racial and ethnic minority groups, is necessary for identifying gaps in our current understanding of service utilization overall and will inform future, optimal strategies to implement for prompt identification and treatment.

**Theoretical Framework**

Andersen’s Behavioral Model of Health Service utilization is a useful guide for examining factors related to service utilization. Andersen’s model includes predisposing, need, and enabling factors as variables that will either act as barriers or facilitators in utilizing health services (Andersen, 1995). Predisposing factors can be defined as one’s socio-cultural context, which includes demographics, health beliefs, childhood characteristics, and social structure-related factors that influence both service utilization directly and indirectly through enabling and need factors. Enabling factors can be defined as characteristics that may act as barriers or facilitators to utilizing services at community, family, and person-levels (e.g., example neighborhood resources, social support, and insurance status). Need factors can be defined as characteristics related to the person’s health needs, both perceived and evaluated, such as depressive symptoms and psychiatric co-morbidities. An understanding of what factors are associated with service utilization among adolescents from racial and ethnic minority groups can
inform future interventions to improve service access among this population who reports lower use of health services. Apart from its focus on adolescents from racial and ethnic minority groups, this review will also be distinct from other reviews on health service utilization among adolescents with suicide risk as it is guided by a comprehensive theoretical framework.

The Present Study

This paper is a scoping review of the literature to assess the current state of the science regarding service utilization characteristics and factors related to utilization for adolescents from racial and ethnic minority groups at risk for suicide. Findings are reported within racial and ethnic group when possible. The following questions are addressed for adolescents from racial and ethnic minority groups who present with self-harm types (i.e., suicidal ideation, suicide attempt, non-suicidal self-injury):

(a) What are the characteristics of documented service utilization (e.g. service sector, type, inpatient/outpatient)?

(b) What are the factors associated and/or described in relation to service utilization (e.g., demographic characteristics, insurance status, psychiatric symptoms)?

Methods

Protocol and Design

The Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Reviews (PRISMA-ScR) was used to guide the methodology of this review (Tricco et al., 2018). Guidelines for the search process, data abstraction, and reporting were utilized, allowing for others to duplicate the processes detailed below. Benefits to utilizing the PRISMA-ScR checklist include demonstrating the procedures for review methods for others to critique and replicate (Tricco et al., 2018).
**Data Sources & Search Terms**

Through consultation with a health sciences research librarian, a search strategy was generated on April 20, 2021 to find articles with adolescents from racial and ethnic minority groups who were documented to utilize services in context of self-harm types. The following terms were used in PubMed/Medline: adolescents, self-harm, suicide, self-injury, and racial and ethnic minority race/ethnic group-specific terms, and a wide range of services (healthcare, mental health, juvenile justice, child welfare, case management, community health, school health, self-help). Similar keywords were used in CINHAL, PsycINFO, Scopus, and Web of Science. For the full search string for each search engine, see Appendix A. There was no limit placed on years covered.

**Eligibility Screening**

After duplicates were removed, records for title and abstract screening were identified using the search strategy above and narrowed through the inclusion and exclusion criteria. The first author (LGB) and second author (TF) independently screened articles using Covidence software (Veritas Health Innovation, 2017). A third author was available to resolve any disagreements (CWG).

The inclusion criteria are as follows:

1. Empirical, data-based (qualitative, quantitative, or mixed-methods), peer-reviewed articles

2. Adolescent sample or analyses by age group, with distinct results for adolescent age ranges. We were inclusive of various definitions of adolescents (e.g., 10-19) as long as the authors described their sample as adolescents.
3. Analyses included results for adolescents from racial and ethnic minority group(s) (e.g., Hispanic, Black, Native American, Asian Americans, and Native Hawaiians and other Pacific Islanders)

4. Specific to the U.S., given the unique context of the U.S. healthcare system

5. Studies reporting on service utilization or non-use in context of self-harm types (suicidality, NSSI).
   a. Self-harm types are defined broadly in order to capture adolescents at various levels of suicide risk.
   b. Service utilization is defined broadly to include school-based, juvenile justice, social services, child welfare, spiritual, and community-based services to capture the wide-range of services that adolescents from racial and ethnic minority groups may be more likely to be in contact with especially in the context of low mental health service utilization rates (Alegria et al., 2010).

The exclusion criteria are as follows:

1. Adult population only (>18 years old)
2. Studies conducted outside the US
3. Reviews/commentary/opinion pieces/no quantitative evaluation/dissertations/books/conference abstracts/theoretical models only
4. Articles in language other than English
5. Focus of study on other health concerns (e.g. asthma, conduct disorder, bipolar disorder) without examination for self-harm types specifically.

**Data Extraction Process**

Before extraction, the first author (LGB) trained the second reviewer (TF) on how to use the extraction tool to improve the accuracy of the data extracted. Then, the reviewers (LGB, TF)
extracted data from the selected articles independently with the extraction tool created by the reviewer and edited by the senior author (CWG). Each study had the following categories of information extracted: study characteristics (e.g., geographic location, quantitative/qualitative/mixed-methods), sample characteristics (e.g., race/ethnicity, age), service utilization characteristics (e.g., sector, type of service), metrics (e.g., % used service), and factors (e.g., insurance, social support, race/ethnicity) examined in relation to service utilization. New columns were added to the extraction tool as needed for additional data, for example, a column was added for questions/concerns that reviewers had during the extraction process, facilitating discussion during reconciliation. Once extraction was completed independently by each reviewer, results were discussed between the two reviewers. Any discrepancies in the data extraction process were resolved by the senior author. After reconciliation of the extracted data, the data were transferred to a table format to identify patterns and themes.

**Synthesis of Results**

Data were summarized and placed into tables by the purpose of each study, design, setting, and sample characteristics (e.g., sample size, race/ethnicity, age group, gender). Data were categorized by the subheadings indicated in Andersen’s model (predisposing, need, and enabling) and characteristics related to the service utilization. We further examined patterns of service utilization within racial and ethnic group when possible. Comprehensive and parsimonious categories were identified and used to organize the patterns. Narrative synthesis and vote counting methods were also used to describe the results from extraction as they relate to aforementioned categories used to organize the tables.
Results

Search Results

After duplicates were removed, 1425 records were identified for title and abstract screening using the search strategy. Ninety articles were identified for full-text review. After assessing 89 of the 90 articles for eligibility, 15 articles met inclusion criteria for the extraction phase. One article was unable to be retrieved due to inability to find a complete version of the article through the university library system. Five of these reports examined the same dataset sample (Alonzo et al., 2016; Alonzo, 2020) or same intervention study (Rotheram-Borus et al., 1996, 1999, 2000). For the purposes of reporting results in this review, these records will be referred to as two studies (Alonzo et al., 2016, 2020; Rotheram-Borus et al., 1996, 1999, 2000) due to use of the same sample and similarity in study variables and outcomes, generating a final count of 12 unique studies and 15 separate reports. Refer to Figure 2.1 for a visual presentation of the search results.

Study Characteristics

Studies were published from 1996-2020. Out of the 12 studies, 9 were quantitative studies, including two emergency department intervention studies to improve treatment adherence after a suicide attempt (Cwik et al., 2016; Rotheram-Borus et al., 1996, 1999, 2000). Three were qualitative studies, including two case studies focused on the experience of an adolescent receiving treatment after a suicide attempt (Kohrt et al., 2017; Schofield, 2013) and one qualitative descriptive study examining treatment narratives (Hausmann-Stabile et al., 2018). Four studies did not examine service utilization within a racial and ethnic group (Bridge et al., 2012; Nestor et al., 2016; Pirkis et al., 2003; Wu et al., 2010). Instead, these studies provided between-group comparisons in service utilization for racial and ethnic minority groups compared to NH White adolescents.
Studies reported mental healthcare (e.g., outpatient therapy, counseling, residential treatment, inpatient psychiatry units) service utilization \((n=11;\) Alonzo, 2020; Alonzo et al., 2016; Bridge et al., 2012; Cwik et al., 2016; Freedenthal, 2007; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Nestor et al., 2016; Pirkis et al., 2003; Rotheram-Borus et al., 1996, 1999, 2000; Schofield et al., 2013; Wu et al., 2010) and/or general healthcare (e.g., primary care, emergency department) service utilization \((n=7;\) Ballard et al., 2014; Bridge et al., 2012; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Schofield 2013; Rotheram-Borus et al., 1996, 1999, 2000; Wu et al., 2010). Other service sectors included spiritual \((n=1;\) Kohrt et al., 2017) and school-based services \((n=1;\) Wu et al., 2010). Eight studies did not report a specific geographic location other than location in the U.S.; the remaining five studies reported American Southwest/Arizona \((n=3;\) Ballard et al., 2014; Cwik et al., 2016; Kohrt et al., 2017) and New York City \((n=1;\) Rotheram-Borus et al., 1996, 1999, 2000).

Sample Characteristics

In the eight studies that explored patterns within distinct racial and ethnic groups, a total of 1,009 adolescents from racial and ethnic minority groups were included, specifically adolescents identified as Hispanic/Latinx \((n=621),\) Black/African American \((n=301),\) Native American \((n=86),\) Asian \((n=1).\) Among these studies, service utilization metrics were provided for Hispanic \((n=4;\) Alonzo, 2020; Alonzo et al., 2016; Freedenthal, 2007; Hausmann-Stabile et al., 2018; Rotheram-Borus et al., 1996, 1999, 2000), Native Americans \((n=3)\) (Ballard et al., 2014; Cwik et al., 2016; Kohrt et al., 2017), Black/African American \((n=1;\) Freedenthal 2007), and Asian \((n=1)\) adolescents (Schofield et al., 2013). Sample sizes ranged from one to 635 adolescents from racial and ethnic minority groups. One study described their sample as “predominantly Puerto Rican or Dominican” (Rotheram-Borus et al., 1996, 1999, 2000) without providing a numerical breakdown of their sample race and ethnicity characteristics—thus, this
study is excluded from the Hispanic/Latinx tally of adolescents represented in the review, but the
findings of these studies are presented within the Hispanic/Latinx sub-headings as the authors
described the results for Latina adolescents. In the between-group studies adolescents
represented include Hispanic/Latinx \((n=1,945)\), Black/African American \((n=1,560)\), Native
American \((n=93)\), and Asian \((n=345)\). Sample sizes ranged from 877 to 4,176 adolescents
overall (including NH White).

Studies examined outcomes for majority female adolescent samples more often than male
adolescents; 11 out of 12 studies had majority female samples (60%-100%). One study examined
service utilization among one male adolescent (Schofield et al., 2013). The most commonly
examined self-harm types for which adolescents sought services were suicide attempt \((n=7;\)
Ballard et al., 2014; Cwik et al., 2016; Hausmann-Stabile et al., 2018; Kohrt et al., 2017;
Rotheram-Borus et al., 1996, 1999, 2000; Schofield et al., 2013; Wu et al., 2010), followed by
suicidality overall \((n=4;\) Alonzo, 2020; Alonzo et al., 2016; Freedenthal, 2007; Nestor et al.,
2016; Pirkis et al., 2003), and deliberate self-harm without regard to suicidal intent \((n=1;\) Bridge
et al., 2012). Four studies examined service utilization among a nationally-representative sample
(not explicitly treatment-involved; Alonzo et al., 2016; Alonzo, 2020; Freedenthal 2007; Nestor
et al., 2016; Wu et al., 2010).

**Theoretical Framework Used**

Out of the 12 studies identified, two studies explicitly incorporated Andersen’s
Behavioral Model of Health Service utilization (Alonzo, 2020; Alonzo et al., 2016; Freedenthal,
2007). No other studies in this review utilized a theoretical framework to investigate service
utilization.
Self-Harm Occurrence (Before, During, After Service Utilization)

Seven studies examined service utilization after self-harm, specifically a suicide attempt, had occurred (Ballard et al., 2014; Bridge et al., 2012, Cwik et al., 2016; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Rotherman-Borus et al., 1996, 1999, 2000; Schofield et al., 2013). Five studies did not distinguish whether the service utilization had occurred before, after, or during an instance of self-harm (Alonzo, 2020; Alonzo et al., 2016; Freedenthal, 2007; Nestor et al., 2016, Pirkis et al., 2003, Wu et al., 2010).

Definitions and Measurement of Service Utilization

All 12 studies defined service utilization to include mental healthcare sectors and/or general healthcare service sectors. Additional service sectors examined in the studies include school-based care ($n=1$; Wu et al., 2010). Service types examined outpatient mental health services only ($n=4$; Alonzo, 2020; Alonzo et al., 2016; Bridge et al., 2012; Pirkis et al., 2003; Rotheram-Borus et al., 1996, 1999, 2000) and crisis-oriented services (e.g., inpatient psychiatry, emergency department) with or without outpatient care ($n=8$; Ballard et al., 2014; Cwik et al., 2016; Freedenthal 2007; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Nestor et al., 2016; Schofield et al., 2013; Wu et al., 2010). Of note, two of the outpatient mental health service utilization studies were from a sample of adolescents who recently received emergency services (Bridge et al., 2012; Rotheram-Borus et al., 1996, 1999, 2000). Other service utilization types included general healthcare ($n=2$; Freedenthal; Hausmann-Stabile et al., 2018), substance use services (Freedenthal 2007), residential treatment (Kohrt et al., 2017), case management (Schofield et al., 2013), and spiritual services (Kohrt et al., 2017).

Most studies ($n=10$) had service utilization metrics, meaning they reported the services used by percentage or number of adolescents (Alonzo, 2020; Alonzo et al., 2016; Ballard et al., 2014; Cwik et al., 2016; Freedenthal, 2007; Hausmann-Stabile et al., 2018; Rotheram-Borus et
The remaining two studies illustrated pathways of service utilization through case study examples (Kohrt et al., 2017; Schofield et al., 2013). Service utilization was measured through the following methods: the Children and Adolescent Services Assessment instrument (n=1; CASA; Angold et al., 1998; Cwik et al., 2016), medical/insurance claims records (n=2; Ballard et al., 2014; Bridge et al., 2012), national dataset self-report data (n=5) (Alonzo, 2020; Alonzo et al., 2016; Freedenthal, 2007; Nestor et al., 2016; Pirkis et al., 2003; Wu et al., 2010), clinician report of sessions attended (n=1; Rotheram-Borus et al., 1996, 1999, 2000) and through qualitative interviews (n=1; Hausmann-Stabile et al., 2018).

**Service Utilization Characteristics**

**Hispanic/Latinx**

Hispanic adolescents with suicidality utilized a mental health care service in the past year at rates that ranged from 23.1% (Freedenthal, 2007) to 28.0% (Alonzo, 2020; Alonzo et al., 2016). More specifically, Hispanic adolescents with suicidality used the following service types: specialty mental health care (19.5%; Freedenthal, 2007) and general healthcare service utilization (4.5%; Freedenthal, 2007). In a sample of Latinas who attempted suicide, rates for various types of service utilization were provided, including outpatient mental health services (n=47; 69.1%), medical care for previous suicide attempt (n=47; 69.1%), emergency room (n=33; 48.5%), inpatient psychiatric services (n=17; 25%), inpatient medical treatment (n=2; 2.9%), and outpatient pediatric care services (n=2; 2.9%; Hausmann-Stabile et al., 2018). In an intervention study, Latinas (in the intervention condition) attended outpatient therapy after they had presented to the emergency department for a suicide attempt. While 95.4% at least one session, only 52.3% completed the prescribed six outpatient sessions.
**Native American**

All three studies examining service utilization for Native American adolescents reported the use of crisis-oriented services such as the emergency department or inpatient care in the context of a suicide attempt (Ballard et al., 2014; Cwik et al., 2016; Kohrt et al., 2017). For example, Cwik et al. (2016) described emergency department use for adolescents participating in a pilot treatment adherence intervention ($M=9.0$ times at baseline, $M=0.3$ times at 3-month follow up). Another study describing emergency department (for mental and/or physical health) use found that 82% of the sample had utilized a local ED before the most recent suicide attempt (Ballard et al., 2014). A case study illustrated the use of mental healthcare services, namely the use of inpatient psychiatric services (Kohrt et al., 2017), as well as transition to residential treatment and outpatient therapy and a traditional healing ceremony after inpatient treatment (Kohrt et al., 2017).

**Black**

For Black adolescents with suicidality, Freedenthal found 23.6% of the sample had used mental health services during the year they experienced suicidality (2007). There were no significant differences in the types of services (specialty mental health, substance use treatment, general healthcare services) utilized for suicidality in Black adolescents (Freedenthal, 2007).

**Asian American**

Among research with Asian American adolescents, one case study described the experience of an adolescent being found unresponsive from an attempted suicide and taken to the emergency department (ED). Following the ED experience, the adolescent was admitted to an inpatient psychiatry unit. During the inpatient stay, individual therapy and case management services were provided (Schofield et al., 2013).
Four comparison studies (all comparing to NH White) examined mental health service utilization in the past year (Nestor et al., 2016; Pirkis et al., 2003; Wu et al., 2010) or past 30 days within ED discharge (Bridge et al., 2012). Pirkis et al. found Asian American adolescents were significantly less likely to receive any mental health services in the year they experienced SA/SI compared to White adolescents (2003). More specifically, mental health inpatient service utilization was significantly lower for Asian, Hawaiian and Pacific Islander (AAPI) with suicidal ideation only ($OR= 0.06$, $95\% CI [0.01, 0.50]$; Nestor et al., 2016), multiracial adolescents who attempted suicide ($OR= 0.09$, $95\% CI [0.01, 0.69]$; Nestor et al., 2016), African American ($AOR= 0.20, p < .01$; Wu et al., 2010), and Hispanic ($AOR= 0.30, p < .01$; Wu et al., 2010) adolescents. In comparison to White adolescents, outpatient mental health service utilization was significantly lower for NH-Black/African-American ($n=2; AOR= 0.4, p < .05$; Wu et al., 2010; $OR= 0.37$, $95\% CI [0.17, 0.83]$; Nestor et al., 2016), Native American ($OR= 0.19$, $95\% CI [0.06, 0.63]$; Nestor et al., 2016), AAPI ($OR= 0.03$, $95\% CI [0.01, 0.13]$; Nestor et al., 2016), and Hispanic ($n=2; AOR= 0.4, p < .01$; Wu et al., 2010; $ARR= 0.78$, $99\% CI [0.64, 0.95]$; Bridge et al., 2012).

Overall, the use of intensive, crisis-oriented service types, such as emergency department or inpatient psychiatry units, was the most commonly reported service utilization for adolescents from racial and ethnic minority groups ($n=7$; Ballard et al., 2014; Bridge et al., 2012; Cwik et al., 2016; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Rotheram-Borus et al., 1996; Schofield et al., 2013). In the between-group studies, significant disparities for inpatient service utilization between racial and ethnic minority and to NH White adolescents were noted (Nestor et al., 2016; Wu et al., 2010). However, it is important to note that the disparities for inadequacy of outpatient
services tended to be of greater magnitude (Bridge et al., 2012; Nestor et al., 2016; Pirkis et al., 2003) for adolescents from racial and ethnic minority groups.

Factors Associated with Service Utilization Based on Anderson’s Model

Predisposing

Seven studies examined predisposing factors, with focus on demographics (Alonzo et al., 2016; Alonzo, 2020; Ballard et al., 2014; Freedenthal, 2007), social structure concerns (Kohrt et al., 2017; Schofield, 2013; Rotheram-Borus et al., 1996, 1999), and health beliefs (Hausmann-Stabile et al., 2018; Schofield et al., 2013; Rotheram-Borus et al., 1996; Rotheram-Borus et al. 1999) components of Andersen’s model. These studies found that demographic predisposing factors, gender and age, were both non-significant factors in predicting service utilization among both Black and Hispanic/Latinx adolescents (Alonzo et al., 2016; Alonzo, 2020; Freedenthal 2007; Rotherman-Borus et al., 1996, 1999). Among Native American adolescents, gender was also a non-significant predisposing factor (Ballard et al., 2014). Below statistically significant or qualitatively-described predisposing factors are reported by racial and/or ethnic group.

Hispanic/Latinx. Latina adolescents reported they viewed their negative inpatient experience as a reason to not attempt suicide again or to not disclose future attempts to avoid future inpatient stays (Hausmann-Stabile et al., 2018). Latinas who came from a single parent household in the ER intervention condition were significantly more likely to adhere to outpatient treatment compared to adolescents in the standard care condition ($b = .27, p < .01; Rotherman-Borus et al., 1999$). For health beliefs, being in the ER intervention group reduced negative maternal attitudes towards treatment resistance, which improved treatment adherence ($b = -.14; p < .05; Rotherman-Borus et al., 1999$).

Native American. Strained family dynamics and communication were a predisposing factor that informed need-related factors (e.g., suicide attempt). For example, the adolescent
reported feeling stressed and anger towards parental figures in her life; the adolescent felt through attempting suicide, she could restore balance in familial patterns so the parental figures in the family could change (Kohrt et al. 2017).

**Black.** No statistically significant findings or qualitative studies to report on.

**Asian American.** Strained family dynamics and communication, as well as culture-, and school-related stressors informed the adolescent’s suicide attempt. This adolescent, a foreign exchange high school student from an East Asian country, reported difficulties adjusting to school in the US, his host family, as well as the pressure of disappointing his family back home. Health beliefs and attitudes associated with medication use hesitancy, were also mentioned as a barrier when the adolescent was in treatment.

**Enabling**

The enabling factors studied were categorized as personal/family resources (n=5; Alonzo et al., 2016; Alonzo, 2020; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Schofield et al., 2013; Rotheram-Borus et al., 1996, 1999) and community resources (n=1; Freedenthal, 2007). Within personal/family resources, insurance and finances (n=3; Alonzo et al., 2016; Alonzo, 2020; Freedenthal, 2007; Kohrt et al., 2017), parental/adult/peer support (n=4; Alonzo et al., 2016; Alonzo, 2020; Hausmann-Stabile et al., 2018; Schofield et al., 2013; Rotheram-Borus et al., 1996, 1999), health service resources (n=2; Freedenthal 2007; Kohrt et al., 2017), and transportation-related resources (n=2; Hausmann-Stabile et al., 2018; Schofield et al., 2013) were examined. One study examined community-level resources through urban status, defined as living in a large city, small city, or a rural setting (Freedenthal, 2007). Intervention status was also associated with service utilization in one study (Rotheram-Borus et al., 1996, 1999, 2000). The intervention included several components such as workshops to address ER staff attitudes towards suicide attempts, a brief family therapy session in the ER, and contact after ER visit by
intervention staff. Below statistically significant or qualitatively-described enabling factors are reported by racial and/or ethnic group.

**Hispanic/Latinx.** An adult figure (e.g., parent, relative, school counselor) or a peer disclosing concern to an adult influenced adults to seek services on behalf of the adolescent \((n=39; 56.5\%)\), while some adolescents \((n=4; 5.9\%)\) initiated services on their own (Hausmann-Stabile et al., 2017). Transportation services, such as police transport to hospital for emergency services when additional assistance was needed to manage the adolescent’s symptoms, also aided in service utilization \((n=19; 27.5\%)\) (Hausmann-Stabile et al., 2018). In an ER intervention study aimed at improving treatment adherence, cohesive and adaptive family interactions \((OR=0.73, 95% CI \[0.55, 0.97\])\) protected against nonattendance to therapy (Rotheram-Borus et al., 1996). Additionally, intervention status \((OR=3.11, 95% CI \[1.20, 16.98\])\), adolescents' perceptions of having an adaptive family \((OR=0.73, 95% CI \[0.55, 0.97\])\) increased the odds of completing the prescribed number of therapy sessions (Rotheram-Borus et al., 1996). Higher levels of family adaptability were also related to having attended at least 3-6 sessions vs. only 0-2 sessions \((t(100) = 2.03, p < .04; \) Rotheram-Borus et al., 2000).

**Native American.** One study described how insurance served as a dis-enabling factor (i.e. barrier) to service utilization. The adolescent’s insurance under Medicaid did not cover the full treatment needed in the residential treatment setting (Kohrt et al., 2017). This same study also described lack of school resources, such as a school psychologist as a barrier to continuing at her current school.

**Black.** No statistically significant findings or qualitative studies to report.

**Asian American.** Transportation services were used to arrange transfer to inpatient psychiatry unit in the adolescent’s country of origin (Schofield et al., 2013).
**Need Factors**

Two categories for need related factors were observed, psychiatric symptoms \((n=7;\) Alonzo et al., 2016; Alonzo, 2020; Ballard et al., 2014; Freedenthal, 2007; Hausmann-Stabile et al., 2018; Kohrt et al., 2017; Schofield et al., 2013; Rotheram-Borus et al., 1996, 1999, 2000) and health-related symptoms \((n=2;\) Alonzo et al. 2016; Alonzo, 2020; Ballard et al., 2014). Health-related symptoms, such as perceived poor health (Alonzo et al., 2016), were not found to be statistically significant factors associated with service utilization. Three studies described how need factors informed service utilization, for example mental health symptom presentation accompanying the suicide attempt (Hausman-Stabile et al., 2018; Kohrt et al., 2017; Schofield et al., 2013).

**Hispanic/Latinx.** Daily mood fluctuations \((OR=6.17, 95\% CI [1.19, 31.98])\) and inattention symptoms experienced within the past week \((OR=4.88, 95\% CI [0.55, 5.76])\) were significantly associated with greater likelihood of mental health service utilization (Alonzo et al., 2016). Suicidal behavior \((OR=0.00, 95\% CI [0.00, 0.46])\) increased the likelihood of attending sessions, while high self-esteem \((OR=1.98, 95\% CI [0.99, 3.95])\), corresponded to a higher likelihood of non-attendance to sessions (Rotheram-Borus et al., 1996). The presence of suicidal ideation increased the likelihood that adolescents would complete treatment \((OR=1.09, 95\% CI [1.00, 7.43])\). In this same intervention study, elevated mental health symptoms (affective, disruptive, and anxiety symptoms) helped explain the association between ER intervention status to treatment adherence, as well as the association between prior psychopathology to treatment adherence (see \(OR\) values in Table 2.2; Rotheram-Borus et al., 1999). Aggressive behaviors towards others in addition to suicidality \((n=27; 81.8\%)\) were present in a large majority of the adolescents who received an inpatient psychiatric unit admission (Hausmann-Stabile et al, 2018).
Native American. One study examined the primary presenting concerns of patients who received services in an emergency department (ED) during their lifetime as well as the year before receiving care for their suicide attempt in the same ED (Ballard et al., 2014). The most common lifetime presenting symptoms included the following: Ears/nose/throat/dental and mouth \((n=404; 28\%)\), trauma \((n=324; 23\%)\), and gastrointestinal \((n=109; 8\%)\) symptoms. The most common presenting symptoms the year before suicide attempt included, physical trauma \((n=47;28\%)\), ears/nose/throat/dental and mouth \((n=35; 21\%)\), psychiatric \((n=14; 8\%)\), and dermatologic \((n=13; 8\%)\) symptoms. A case study described the adolescent’s suicide presentation as severe (i.e. overdose; 3 previous suicide attempts in past year) in addition to the presence of aggressive behaviors and thoughts towards family and peers (Kohrt et al., 2017).

Black. Conduct disorder symptoms \((OR= 1.29, 95\% CI [1.02-1.62])\) and substance dependence \((OR= 5.84, 95\% CI [2.32-14.73])\) were significantly associated with an increased likelihood to utilize mental health services (Freedenthal, 2007).

Asian American. An adolescent who received inpatient services presented with a severe suicide attempt presentation, including self-inflicted cuts to the wrists (Schofield et al., 2013).

Discussion

This scoping review aimed to identify factors associated with service utilization for racially-ethnically diverse adolescents who report self-harm types. Findings from this review provide preliminary insights about service utilization characteristics among adolescents from racial and ethnic minority groups with self-harm/suicidality and the factors associated with use of services. Given the small sample of within-group studies included \((n=8)\), the main findings are discussed more broadly as it pertains to adolescents from racial and ethnic minority groups overall. Three main findings emerged from this review: (a) the most common self-harm presentation precipitating service utilization was a suicide attempt, which warranted intensive,
crisis-oriented services (b) family-level characteristics, such as adaptability and awareness of the adolescent’s self-harm types may facilitate service utilization, and (c) the need factors most commonly described and/or associated with service utilization are externalizing symptom presentations. We also provide implications for future research and examine strengths and limitations of the current review.

Service utilization was most commonly reported after a suicide attempt. Thus, service utilization overall was largely characterized by crisis-oriented services for a suicide attempt, including inpatient psychiatry, emergency department care, and admission into residential facilities. Findings from a previous review examining mental health service utilization among adolescents from racial and ethnic minority groups found emergency services were more commonly accessed among minority adolescents, especially among Black adolescents (Lu et al., 2021). Therefore, these findings point to a larger trend of inadequate access to preventative, outpatient services across mental health concern types. Of note, studies in our review predominantly focused on treatment-involved adolescents who attempted suicide, suggesting adolescents from racial and ethnic minority groups who seek treatment may be more readily referred to crisis-oriented services due to either (a) lack of outpatient services available or (b) severe presentation, such as a suicide attempt, once self-harm types are identified. Next steps may include examining referral and follow-up rates for adolescents from racial and ethnic minority groups who screened positive in a service setting for self-harm/suicidal ideation and understanding what facilitated or impeded follow-up for concerns such as suicidal ideation and/or self-injurious behaviors.

Adaptive family interactions and having family members aware of self-harm types may facilitate service utilization (Hausmann-Stabile et al., 2018; Rotheram-Borus et al., 1996, 1999,
2000). Potentially, when behavioral concerns were identified and perceived as urgent, parents and/or other family members were more likely to seek services on behalf of the adolescent and encourage continuation of treatment. For example, suicidal ideation without intent or plans, may seem less urgent to seek treatment for, compared to an attempt or observed self-injurious behaviors such as cutting. However, in one study family characteristics such as parental support for autonomy and parenting quality was not associated with increases in outpatient mental health service utilization (Alonzo et al., 2016). Future studies should examine what specific family characteristics are associated with increased perceived mental health needs and seeking services.

This information could inform program development for parents and key stakeholders in environments adolescents are seen, such as schools and churches, to discuss how to talk about suicide and self-harm and create a safe environment for disclosure. While such programs exist for adolescents in treatment, for example the Life is Precious program for Latina adolescents (Humensky et al., 2017), strategies to implement additional programs in community settings that are open to adolescents not in treatment are essential to making self-harm disclosure and care more accessible.

Although studies evaluated a broad range of symptom presentations, externalizing behaviors (e.g., inattention for Latinx adolescents and conduct disorder symptoms for Black adolescents) were most commonly identified precipitants to service utilization. Symptoms such as depression were also commonly associated with self-harm, however, these internalizing symptoms did not necessarily associate with increased receipt of service. Adolescents from racial and ethnic minority groups are less likely to use or have access to services in response to internalizing symptoms compared to externalizing symptoms (Lu et al., 2021). Identification and treatment of internalizing symptoms, such as anxiety and depressive symptoms, can prevent the
occurrence of more severe self-harm and suicide (Kranzler et al., 2016). Future studies should also examine need factors related to reports of physical health symptoms for this population. It is important to note that physical symptoms, such as tachycardia and gastrointestinal distress, among otherwise physically healthy adolescents, may accompany the presentation of self-harm types, such as suicidal ideation (Crawford et al., 2019). Thorough evaluation of these types of symptoms may provide opportunities to help adolescents receive proper mental, as well as physical healthcare services.

Notably, there was a lack of structural- and culture-related factors to service utilization. The only structural factor examined was financial resources, specifically insurance status, which resulted in mixed findings in our review. In a previous review, of literature addressing adolescents from racial and ethnic minority groups and their use of mental health services, insurance (any type) emerged as a facilitator to receipt of services (Lu et al., 2021). Future studies should aim to examine with more granularity the role of insurance (e.g., coverage type) as well as additional structural-related factors, such as neighborhood resources. Additionally, the studies reviewed did not examine culture-specific factors related to service utilization for self-harm types. This is relevant for tailoring of strategies to improve service access and use. For example, stigma within racial and ethnic minority communities for mental health service utilization (Fripp & Carlson, 2017; Rastogi et al., 2012) and self-harm types (Dueweke & Bridges, 2017; Campbell & Mowbray, 2016) are well documented. However, the intersection between how these beliefs impact service utilization among adolescents from racial and ethnic minority groups has not been explored.

**Strengths and Limitations of Included Studies and Review Process**

This scoping review provided an overview of the existing literature and illuminated a number of important considerations for future research with adolescents from racial and ethnic
minority groups who present with self-harm types. However, a lack of longitudinal studies, representation of certain racial and ethnic minority populations, variation in service sectors used, definitions of self-harm, and overall gaps in literature examining health service utilization among adolescents from racial and ethnic minority groups dampen the strength of our conclusions. Out of the 12 studies utilized for extraction, only one study was a longitudinal study, limiting our ability to understand when services are sought in relation to a self-harm type. Of the racial and ethnic minority populations included in the reviewed studies, although there was a limited number of within racial and ethnic group studies, Asian American and African American adolescents were especially underrepresented. The service sectors utilized were primarily mental health specific and general healthcare services. In our search strategy, we included the use of other service sectors, such as social, school, juvenile justice and community-based health services in the context of self-harm types. However, no studies examined the aforementioned service sectors specifically for self-harm types. Thus, no documentation exists on whether adolescents from racial and ethnic minority groups receive services in school, juvenile justice, and/or community settings. Additionally, the articles in this review focused on suicide attempt presentations or broad definitions of suicidality; these findings may not be generalizable to adolescents who are ideating only or engaging in self-injury or ideation only.

The review process itself also had several limitations, such as the limited number of studies that met inclusion criteria and the secondary focus on service utilization in two studies. A strength of the review process includes guidance of methods through the utilization of PRISMA-ScR (Tricco et al., 2018), use of two reviewers, and the level of detail provided on the factors examined in relation to service utilization.
Implications and Future Directions

Identifying the processes between adolescents’ access to general health services and their eventual referral to more targeted mental health care to address mental health concerns could help guide the creation of interventions to promote prevention and effective treatment. We suggest investigating avenues to accessing mental healthcare service by examining service utilization more broadly to include services adolescents from racial and ethnic minority groups who self-harm may be more likely to encounter. For example, when considering the existing literature on correlates of mental health service utilization access, no studies included suicide hotlines, which are potential avenues for service referral. Suicide hotlines have been integrated in the media targeting adolescents through popular music (Gajewski-Nemes & Nugent, 2021), increasing the visibility of this avenue for help-seeking and eventual receipt of services. We also call for research to include samples of adolescents who are uninsured and to investigate by type of insurance coverage, as this may be an important barrier or facilitator for adolescents requiring highly specialized, intensive mental healthcare services for self-harm.

Future research should also aim to be more inclusive of Asian American/Pacific Islander, Native American, and African American/Black adolescents in their study samples. This gap has been demonstrated not only by our review, but also prior reviews where there were limited studies on certain racial ethnic groups such as Asian adolescents and their mental health service utilization, which may be due to their overall under-identification of mental health problems (Lu et al., 2021). Furthermore, when studies are investigating service utilization within group, an examination of factors contributing to within-group differences in service utilization characteristics, such as acculturation status and immigrant status, should be included to tailor future interventions. These within-group characteristics can inform an individual’s familiarity
with the healthcare system and if they are able to obtain health insurance, and are thus important to study in the context of service access and utilization.

**Conclusion**

The purpose of this scoping review was to examine empirical, peer-reviewed articles documenting service utilization characteristics and associated factors to utilization for adolescents from racial and ethnic minority groups reporting self-harm types. The findings from this review provided initial data on where racial and ethnic minority adolescent, namely intensive, crisis-oriented healthcare services, and under what circumstances, such as symptom presentations, they receive services for self-harm types. Based on these current studies, future studies on service utilization characteristics and related factors should more comprehensively examine (a) multiple service sectors, such as school-based healthcare and social services, (b) structural and cultural-related factors related to service utilization, and (c) service utilization among especially understudied groups such as African-American/Black and Asian American/Pacific Islander adolescents. Additional research to address the aforementioned gaps in our understanding of service utilization for self-harm types will contribute to building research-informed approaches to self-harm prevention interventions and treatment resources that align with the needs of adolescents from racial and ethnic minority groups.
Figure 2.1. PRISMA Flow Chart

**Identification of studies via databases and registers**

Identification:
- Records identified from on 4.20.21
- Databases (n = 5):
  - PubMed/Medline: 678
  - Web of Science: 606
  - Scopus: 425
  - PsychInfo: 395
  - CINHAL: 216
- Total: 2320

Records removed before screening:
- Duplicate records removed (n=895)
- Records marked as ineligible by automation tools (n = 0)
- Records removed for other reasons (n = 0)

Records screened (title/abstract) (n = 1425)
- Records excluded** (n = 1355)

Screening:
- Reports sought for retrieval (n = 90)
- Reports not retrieved (n = 1)

Reports assessed for eligibility (n = 89)
- Reports excluded:
  - Wrong outcomes (n=47)
  - Wrong patient population (n = 10)
  - Wrong study design (n = 11)
  - Wrong setting (n = 1)

Included:
- Studies included in review (n = 12)
- Reports of included studies (n = 15)
Table 2.1. Study and Sample Characteristics

<table>
<thead>
<tr>
<th>Citation</th>
<th>Purpose</th>
<th>Study Design</th>
<th>Setting</th>
<th>Sample Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Geographical Location</td>
<td>Service Sector(s)</td>
</tr>
<tr>
<td>Alonzo et al. 2020</td>
<td>Examine if parental factors inform service utilization</td>
<td>QUANT (retrospective, cross-sectional)</td>
<td>U.S. MH</td>
<td>210</td>
</tr>
<tr>
<td>Alonzo et al. 2016</td>
<td>Identify correlates of service utilization</td>
<td>QUANT (retrospective, cross-sectional)</td>
<td>U.S. MH</td>
<td>219</td>
</tr>
<tr>
<td>Ballard et al. 2014</td>
<td>Examine reservation-based ED use</td>
<td>QUANT (retrospective, cross-sectional)</td>
<td>Arizona HC</td>
<td>72</td>
</tr>
<tr>
<td>Cwik et al. 2016</td>
<td>Describe adaptation of a treatment adherence intervention and its pilot testing</td>
<td>QUANT (prospective; pilot ED program for SA treatment adherence; no comparison; pre-/post-test)</td>
<td>Arizona MH</td>
<td>13</td>
</tr>
<tr>
<td>Freedenthal 2007</td>
<td>Examine service utilization rates and its predictors within &amp; between racial/ethnic group</td>
<td>QUANT (retrospective, cross-sectional)</td>
<td>U.S. MH, HC</td>
<td>2226 total; 635 NH Black /Hispanic</td>
</tr>
<tr>
<td>Hausmann-Stabile et al. 2018</td>
<td>Describe experiences of treatment/service utilization</td>
<td>QUAL (retrospective, descriptive)</td>
<td>U.S. MH, HC</td>
<td>68</td>
</tr>
<tr>
<td>Kohrt et al. 2017</td>
<td>Illustrate DBT culturally-adapted DBT for SA</td>
<td>QUAL (Psychotherapy Intervention case study)</td>
<td>American Southwest MH; HC; Spiritual/Cultural Services</td>
<td>1</td>
</tr>
<tr>
<td>Rotheram-Borus et al. 1996</td>
<td>Evaluate outpatient treatment adherence after ER visit intervention</td>
<td>QUANT ED program for SA, quasi-experimental TAU group present</td>
<td>New York City, NY MH, HC</td>
<td>140 adolescents; 140 mothers</td>
</tr>
<tr>
<td>Rotheram-Borus et al. 1999</td>
<td>Identify predictors of treatment</td>
<td>QUANT ED program for SA, quasi-</td>
<td>New York City, NY MH, HC</td>
<td>140 adolescents; 140 mothers</td>
</tr>
<tr>
<td>Authors</td>
<td>Design</td>
<td>Setting</td>
<td>Sample</td>
<td>Outcome</td>
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<tr>
<td>Rothera m-Borus et al., 2000</td>
<td>QUANT</td>
<td>New York City, NY</td>
<td>MH, HC</td>
<td>140 adolescents; 140 mothers</td>
</tr>
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<td>Schofield 2013</td>
<td>QUAL</td>
<td></td>
<td>MH, HC</td>
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<td>Bridge et al., 2012</td>
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<td>HC, MH</td>
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<td>Nestor et al., 2016</td>
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<td>Pirkis et al., 2003</td>
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<td>U.S.</td>
<td>MH</td>
<td>2482</td>
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<tr>
<td>Wu et al., 2010</td>
<td>QUANT</td>
<td>U.S.</td>
<td>MH, HC, school</td>
<td>877</td>
</tr>
</tbody>
</table>
AAPI: Asian Americans & Native Hawaiians and Other Pacific Islanders; ER: Emergency Room; ED: Emergency Department; GAD: Generalized anxiety disorder; HC: HC (general); MDD: Major depressive disorder; NR: Not reported; MH: Mental Healthcare SA—Suicide Attempt; SI: Suicidal Ideation; TAU: Treatment as usual

Note. Bold, text indicates reports that belong to the same study.
### Table 2.2. Service Utilization Characteristics and Factors Related to Use

<table>
<thead>
<tr>
<th>Citation</th>
<th>Theoretical Framework</th>
<th>Service utilization Definition</th>
<th>Self-Harm Occurrence</th>
<th>Service Utilization Characteristics</th>
<th>Correlates and factors related to service utilization (Predisposing, Need, Dis-/Enabling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alonzo et al. 2020</td>
<td>Andersen’s Behavioral Model of Health Service utilization</td>
<td>MH services (past yr.): psychological/emotional counseling</td>
<td>NR; Authors report SA/SI in past yr.</td>
<td>~28% received MH services</td>
<td><strong>Predisposing (all NS):</strong> Gender (NS); Age (NS) <strong>Dis-/Enabling (all NS):</strong> Parental support for autonomy, maternal parenting quality, total family income, no medical care, no insurance, physical exam <strong>Need:</strong> Perceived poor health (NS), depressed mood (NS), SA (NS), impulsivity (NS), moodiness within 12 mo. (NS); daily mood fluctuations (OR= 6.17*, 95% CI [1.19, 31.98]), Inattention in past wk (4.88***, [0.55, 5.76])</td>
</tr>
<tr>
<td>Alonzo et al. 2016</td>
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<td>MH services (past yr.): psychological/emotional counseling</td>
<td>NR; Authors report SA/SI in past yr.</td>
<td>~28% received MH services</td>
<td><strong>Predisposing (all NS):</strong> Gender; Age <strong>Dis-/enabling (all NS):</strong> Family income, no insurance, no medical care, physical exam <strong>Need:</strong> Perceived poor health (NS), SA (NS) within 12 mo. (NS), impulsivity (NS), depressed mood (NS), mood fluctuations within 12 mo. (NS); Daily mood fluctuations: OR= 4.78*, 95% CI [1.06, 21.55], Inattention in past wk.: (4.46**, [1.56, 12.79])</td>
</tr>
<tr>
<td>Ballard et al. 2014</td>
<td>NR</td>
<td>ED use (past yr.)</td>
<td>Before and After SH</td>
<td>100% utilized the ED after SA; 82% utilized ED in the yr. before SA; Lifetime ED visits: Median: 18, Range: 2-52</td>
<td><strong>Predisposing:</strong> Gender (NS) <strong>Need:</strong> Common presenting problems before the SA ED visit: Ears/nose/throat/dental mouth (n=35; 21%); Trauma (n=47; 28%); Psychiatric (n=14; 8%); Dermatologic (n=13; 8%)</td>
</tr>
<tr>
<td>Cwik et al. 2016</td>
<td>NR</td>
<td>MH services use (past 30 days); Outpatient, ED</td>
<td>After SH</td>
<td>Times services accessed 1 mo. post-intervention: M=12.9; 2 mo.=10.2 Outpatient visits 2 mo. M=3.6; 3 mo.=2.8; ED use during the study period (M=9.0 times at baseline; 1 mo.=0.9 times, 2 mo.=0.3, 3 mo.=0.3)</td>
<td><strong>Predisposing:</strong> Hispanic or NH Black: Gender, Age <strong>Dis-/enabling (all NS):</strong> Hispanic or NH Black: Income, Insurance; Urban status <strong>Need:</strong> Hispanic or Black: Psychiatric symptoms no CD; Suicideality severity (NS) Hispanic only: CD symptoms (NS), Substance use (NS) <strong>Black only:</strong> CD (OR= 1.29*, 95% CI [1.02-1.62], Substance use (5.84**, [2.32-14.73])</td>
</tr>
<tr>
<td>Freedenthal 2007</td>
<td>Andersen’s Behavioral Model of Health Service utilization</td>
<td>MH services (past yr.): Specialty MH, substance use services, general medical services</td>
<td>NR</td>
<td>Overall service utilization: (Black 23.6%); Hispanic (23.1%): <strong>General HC:</strong> Black (2.7%); Hispanic (4.5%); <strong>Substance use:</strong> Black (4.3%); Hispanic (4.2%); Specialty MH: Hispanic (19.5%); Black (21.4%)</td>
<td><strong>Predisposing (all NS):</strong> Hispanic or NH Black: Gender, Age <strong>Dis-/enabling (all NS):</strong> Hispanic or NH Black: Income, Insurance; Urban status <strong>Need:</strong> Hispanic or Black: Psychiatric symptoms no CD; Suicideality severity (NS) Hispanic only: CD symptoms (NS), Substance use (NS) <strong>Black only:</strong> CD (OR= 1.29*, 95% CI [1.02-1.62], Substance use (5.84**, [2.32-14.73])</td>
</tr>
<tr>
<td>Rotheram-Borus et al., 1996</td>
<td>NR</td>
<td>Attendance at least 1 session, completion of outpatient therapy, total number of sessions</td>
<td>After SH</td>
<td>100% presented in ER At least 1 session: 95.4% (intervention) vs. 82.7% (standard care), X²= 5.56, df=1, p=0.02; Completion of Tx, # of treatment sessions (NS)</td>
<td><strong>DV:</strong> Nonattendance <strong>Enabling:</strong> cohesive and adaptive family interactions (OR= 0.73*, 95% CI [0.55, 0.97] Intervention Status (0.00**, [0.00, 0.50]) <strong>Need:</strong> Suicidal behavior (0.00*, [0.00, 0.46]); Self-esteem (1.98*, [0.99, 3.95]) <strong>DV:</strong> Completing treatment/Lost to Treatment <strong>Enabling:</strong> Intervention status (3.11*, [1.20, 16.98]); Adolescents' perceptions of adaptive family (0.73*, [0.55, 0.97]) <strong>Need:</strong> SI (1.09*, [1.00, 7.43])</td>
</tr>
<tr>
<td>Study, Year</td>
<td>Type of Study</td>
<td>Intervention Details</td>
<td>Differences Between Intervention TAU</td>
<td>DV: Adolescent treatment adherence</td>
<td>Mediation effects via: Prior psychopathology (Affective ($\beta = 0.55^{<strong>}$); Disruptive ($\beta = 0.24^{</strong>}$); Anxiety ($\beta = 0.32^{<strong>}$) $\rightarrow$ adolescent symptoms ($\beta = 0.30^{</strong>}$); ER intervention ($\beta = -0.23^{<strong>}$) $\rightarrow$ adolescent symptoms ($\beta = 0.30^{</strong>}$); ER Intervention ($\beta = -0.34^{<strong>}$) $\rightarrow$ Maternal attitudes towards treatment ($\beta = -0.14^{</strong>}$)) Direct effects via: Anxiety ($\beta = -0.21^{<strong>}$), disruptive ($\beta = 0.29^{</strong>}$), ER ($\beta = 0.51^{<strong>}$), single parent ($\beta = 0.27^{</strong>}$))</td>
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</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Type of Service</td>
<td>Year</td>
<td>Reporting</td>
<td>Type of SA/SI</td>
</tr>
<tr>
<td>-------------------------------</td>
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<tr>
<td>Pirkis et al., 2003</td>
<td>NR</td>
<td>Counseling services in the past yr.</td>
<td>NR</td>
<td>Authors report SA/SI in past yr.</td>
<td>28% received services; Service utilizing adolescents: 34% a private practice/ school, 18% community clinic</td>
</tr>
<tr>
<td>Wu et al., 2010</td>
<td>NR</td>
<td>MH service (past yr.): inpatient, outpatient, and school-based</td>
<td>NR</td>
<td>Authors report SA/SI in past yr.</td>
<td>45% received any services; Service utilizing adolescents: 22% inpatient, 59% outpatient but no inpatient, and 19% only school-based services</td>
</tr>
</tbody>
</table>

AAPI: Asian Americans & Native Hawaiians and Other Pacific Islanders; AOR: Adjusted Odds Ratio; ARR: Adjusted Risk Ratio; CD: Conduct disorder symptoms; CI: Confidence Interval (95% unless otherwise specified); DV: Dependent Variable; ED: Emergency Department; ER: Emergency Room; Mo: Month; MH: Mental Healthcare; NH: Non-Hispanic; NR: Not reported; OR: Odds Ratio; Pt: Patient; SH: Self-Harm; Urban Status: (Large city, small city, rural); Yr.: Year; Significance Levels: (* p<0.05; **p<0.01, ***p<.001)
REFERENCES


CHAPTER 3: RACIAL, ETHNIC, AND GENDER DISPARITIES IN SERVICES UTILIZATION AMONG ADOLESCENTS WITH ELEVATED RISK FOR SELF-HARM

Introduction

Suicide is the second leading cause of death among adolescents (Curtin & Heron, 2019) in the United States. In the CDC’s 2019 Youth Risk Behavior Surveillance System Report (YRBS), 18.8% of high school students reported having seriously considered attempting suicide (Ivey-Stephenson et al., 2020). Racial and ethnic and gender differences exist in self-harm types\(^4\), as well as access to mental health services preceding suicide. For example, Black and Hispanic adolescents attempt suicide at higher rates than NH White adolescents (NH White 7.9%, Hispanic: 8.9%, Black: 11.8%) over a 12 month period (Ivey-Stephenson, 2020). Further, suicide attempts among Black adolescents have risen by 73% between the years 1991 to 2017 (CDC, 2018) and recently surpassed suicide attempt rates of Hispanic and NH White adolescents (Ivey-Stephenson, 2020). There are also gender\(^5\) differences in self-harm risk. Adolescent girls are more likely to report suicidal ideation, plans, attempts, and non-suicidal self-injury (Brown & Plener 2017; Husky et al., 2012) compared to boys. Adolescent boys have higher rates of completed suicide (Murphy et al., 2017) compared to girls.

The provision of comprehensive mental health care to adolescents who have self-harm types is essential to the prevention of future suicide attempts. However, low rates of help-seeking and service engagement are barriers to treatment provision among adolescents who self-harm

\(^4\) Defined as suicidal ideation, attempts, non-suicidal self-injury.

\(^5\) Defined as female or male.
(Michelmore & Hindley 2012; Husky et al., 2012). For example, only 56.9% of adolescents who attempted suicide in the past year received mental health services (Husky et al., 2012). Rates of mental health service utilization for self-harm types also vary across race, ethnicity, and gender (Goldston et al., 2008; Michelmore & Hindley 2012). Black and Hispanic adolescents, for example, utilize mental health services (generally and for self-harm types) at lower rates compared to NH White adolescents, despite reports of equal or greater symptom severity (Freedenthal, 2007; Lopez et al., 2008; Marrast et al., 2016; Zimmerman, 2005). With regard to gender, female adolescents with self-harm types have higher rates of service utilization compared to those without suicidal ideation, plans, and/or attempts (Cheung et al., 2009; Husky et al., 2012; Wu et al., 2010).

Two significant gaps exist in studies that have examined healthcare system service utilization among adolescents. First, examinations of services utilized have been limited to those systems that formally provide healthcare and excludes service systems in which many adolescents receive health-related services (e.g., child welfare, juvenile justice systems). Second, the intersection of gender, race/ethnicity and self-harm types has not been examined, despite evidence that each of these factors differentially influences service utilization. By examining which services are accessed by adolescents who self-harm compared to those who do not and examining the interactive effects of race/ethnicity and gender with self-harm, we may better understand where a broader range of adolescents receive care for self-harm types. This

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6 We utilize the term overall healthcare system use to encompass both specialty mental healthcare service such as outpatient therapy, and general healthcare services such as the emergency department and primary care.

7 While race and/or ethnicity and gender itself does not predispose the individual to lower service utilization, the environmental and social circumstances of individuals who belong to racial and ethnic-minority groups does perpetuate lack of service access and use.
information may inform and enhance suicide prevention and identification strategies that reduce existing race, ethnicity, and gender disparities.

**Theoretical Framework**

We utilized Andersen’s Behavioral Model of Health Service utilization for Vulnerable Populations (Figure 1) as a guide for understanding which predisposing and need factors interact with each other and impact service utilization (Andersen, 1995; Gelberg et al., 2000; von Lengerke et al., 2014). Predisposing factors are defined as characteristics of the individual (e.g. socioeconomic status, race/ethnicity, gender) that may (a) inform an individual’s health condition and (b) facilitate or impede access to services. Need factors are defined as characteristics of the individual’s health condition (e.g., psychiatric symptoms, physical condition), both as evaluated by the individual and service providers. Herein, we are specifically interested in examining under what predisposing characteristics (i.e. gender, race/ethnicity) is the need factor, self-harm, informing service utilization characteristics.

**Service Utilization Characteristics for Self-Harm by Race/Ethnicity and Gender**

**Service Utilization Characteristics Previously Reported**

In previous studies examining race, ethnicity (Bridge et al., 2012; Freedenthal 2007; Nestor et al., 2016; Wu et al., 2010), and gender disparities (Cheung et al., 2009; Guerra & Visiliadis 2016; Husky et al., 2012; Wu et al., 2010) in service utilization among youth and adolescents with self-harm types, service utilization is generally operationalized as a broad service utilization variable, such that services across sectors such as general healthcare, specialty mental healthcare, and school-based services are collapsed together (Cheung et al., 2009; Freedenthal 2007; Husky et al., 2012). Other studies have described differences in level of care, such as outpatient or inpatient services (Bridge et al., 2012; Guerra et al., 2016; Nestor et al., 2016; Wu et al., 2010). A minority of studies have examined service utilization by sector.
Previous service sector studies have examined by school-based mental healthcare services (Wu et al., 2010) or general medical services settings (Freedenthal 2007).

**General Service Utilization**

Several studies have examined service utilization by creating a variable that encompasses the frequency or number of services used and/or broad definitions of service utilization that do not account for the type of service sector accessed. One study utilized a broad definition of service utilization, combining multiple service sectors such as general medical services, mental health care, school-based, and/or substance use treatments (Freedenthal 2007). Results from this study indicated that Black and Hispanic adolescents were significantly less likely to use services compared to NH White (Freedenthal 2007). In studies examining gender differences (Cheung et al. 2009; Husky et al. 2012), both studies found female adolescents were more likely to have accessed services for suicidality (Cheung et al., 2009) or suicidal ideation (Husky et al., 2012) when compared to males. A broad definition of service utilization can include the amount and/or the variety of services used to address self-harm, however, there is limited utility of this metric for distinguishing where adolescents who self-harm actually receive services.

**Intensity of Services**

Black adolescents, regardless of level of suicidality (ideation vs. attempt), are less likely to use outpatient mental health services compared to NH White adolescents (Nestor et al., 2016). For Hispanic adolescents presenting with suicidality, there are mixed findings. One report demonstrated service utilization, for ideation or attempt, did not significantly differ for outpatient service utilization compared to NH White adolescents (Nestor et al., 2016). Other studies report Hispanic adolescents presenting with self-harm types are less likely to access outpatient services compared to NH White adolescents (Bridge et al., 2012; Wu et al., 2010). For inpatient mental health services, disparities between NH White, Black, and Hispanic adolescents were reduced to
non-significant levels in one study (Nestor et al., 2016), especially as the self-harm type increased in severity (i.e. suicide attempt), suggesting crisis-oriented services may be accessed more frequently for adolescents from racial and ethnic minority groups. Both studies that examined gender differences (Guerra et al, 2016; Wu et al., 2010), reported lower rates of outpatient mental health service utilization among boys when compared to girls (Guerra et al., 2016; Wu et al. 2010). However, no gender differences were noted for inpatient mental health service utilization (Wu et al., 2010) or emergency department visits (Guerra et al., 2016). This operationalization of service utilization is useful in understanding if the severity of the self-harm type associates to mental health service utilization. However, other service sectors accessed in the context of self-harm types may also be accessed or adolescents may be placed into, such as juvenile justice in lieu of mental healthcare.

**Service Sector**

Only one study has examined race/ethnicity and gender differences by service sector (Wu et al., 2010). When comparing racial and ethnic groups by school-based and mental health sectors, differences in service utilization were present within mental health (Freedenthal 2007; Wu et al., 2010), but not school-based services (Wu et al., 2010). These findings highlight the greater tendency among Black and Hispanic populations to engage in emergency and crisis-oriented services. This trend may relate to treatment access, such that non-specialty health services (ex. Primary care) may be more readily accessed by individuals from racial and ethnic minority groups compared to specialized mental health care services (Alegria et al., 2002; Wang et al., 2006). No significant differences in service sector use were found by gender (Wu et al., 2010).
Present Study

The purpose of this study was to examine differences in service utilization characteristics (i.e., number of services used, service sector, intensity) among adolescents presenting with self-harm by race, ethnicity and gender. More specifically, we examined the main and interaction effects of race/ethnicity, self-harm, and gender on service utilization. We hypothesized that adolescents with self-harm types will be more likely to access a higher number of services overall, engage in use of more intensive healthcare services (e.g., ER, inpatient, residential, in-home counseling) when compared to less intensive healthcare services. Likewise, we expect those youth reporting self-harm to engage in higher use of mental health and other healthcare sectors compared to those with no self-harm types. Further, we predict patterns of service utilization will differ by racial and ethnic group. Specifically, Black and Hispanic adolescents with self-harm behaviors will demonstrate access to a lower number of services compared to NH White adolescents. Among Black and Hispanic adolescents, we predict that intensive services will be more likely to be accessed, reflecting a more severe symptom presentation once they are identified and referred to care. In addition, Black and Hispanic adolescents who present with self-harm will be more likely to utilize school-based, juvenile justice, and social service sectors compared to NH White adolescents.

We also predict that service utilization characteristics will differ by gender, such that female adolescents will be more likely to access mental health and health-care focused services overall compared to boys, due to girls’ greater likelihood of experiencing internalizing symptoms (e.g., depression) or physical health problems (e.g., somatic concerns). Conversely, boys will be more likely to receive intensive services, such as in emergency medical, and juvenile justice settings, due to higher rates of experiencing behavioral problems among boys compared to girls.
Within racial and ethnic and gender group differences in service utilization for self-harm will also be explored for significant interaction effects.

Methods

Design

This study is a cross-sectional, secondary data analysis of baseline (initial intake) assessment data from the National Child Traumatic Stress Network (NCTSN) Core Data Set (CDS). The NCTSN is a federally-funded initiative designed to provide trauma-informed mental health services for youth who have experienced or witnessed trauma. Institutional Review Boards (IRB) at Duke University Health System and other participating sites approved this study for data collection. A data use agreement was approved for the current secondary data analyses between the University of North Carolina at Chapel Hill and Duke University. Given that trauma-exposed populations are more likely to endorse self-harm types, we believe the use of the NCTSN CDS is well-aligned with our primary aim of understanding service utilization patterns among adolescents who self-harm.

Setting and Procedures

The dataset used in this study was originally created as a quality improvement initiative across 56 clinical sites across the United States. The goal of this quality improvement initiative was to support the provision of trauma-informed mental health services to children and adolescents within the US (Greeson et al., 2011; Layne et al., 2014). The settings for each of the 56 clinical sites varied and included university-affiliated clinics, community centers, hospitals and residential treatment facilities.

Training on how to administer all clinical measures and tools in the electronic data capture system coordinated by the National Center for Child Traumatic Stress (NCCTS) at Duke University to all clinicians at NCTSN clinical sites. Data were collected from various sources,
including clinicians, caregivers, family members, and the youth in treatment. Data were collected from youth who had an encounter with a clinician at an NCTSN clinical site any time between 2004 to 2010.

Sample

The NCTSN CDS contains data from children and adolescents seeking trauma-related services. Collected data includes demographics, trauma history profiles, traumatic stress symptoms, and service system utilized (e.g., social services, juvenile justice). A total of 14,088 cases exist for both children and adolescents, and of these cases, 8,021 are for adolescents ages 12-17 specifically. For the purpose of the current study, we used a subset of the NCTSN CDS. Specifically, we filtered data by age to examine adolescents ranging from age 12 to 17. We then examined only those cases that had data present for all independent variables of interest (age, trauma exposure, insurance, race and ethnicity, gender, self-harm types). We limited our analyses to the subsample of youth that had data consistently aligned with the variables in the regression and theoretical models. This resulted in a final sample of 4,980 adolescents.

Measures

Demographics

Baseline data were collected on age, gender, race, ethnicity, and insurance type (e.g., public, private, other and status (e.g., yes or no) at baseline assessment visit at each NCTSN-affiliated site. Gender was a self-reported variable. Adolescents were categorized and coded as either male or female. Self-reported race and ethnicity data were categorized as (NH) White, NH Black, and Hispanic. Due to low numbers of adolescents self-identifying as Asian, Native Hawaiian/Pacific Islander, and American Indian/Alaska Native, we did not include these racial and ethnic groups. For example, when the sample was restricted to adolescents who accessed services and had complete data for the independent variables of interest (i.e. self-harm, trauma
exposure, gender, insurance), Asian (n=44) and American Indian (n=33) adolescents did not have a sufficient number of cases for the proposed regression models. For insured status, data was collected at baseline on whether they were insured by public and/or private, or not insured. We operationalized a positive response to insurance status as the presence of any type of insurance, and a negative response as having no reported insurance (public or private).

**Service Utilization**

At the baseline assessment, all informants (i.e. parents/caregivers, adolescents, clinicians) completed a “Services Received” form. This form asks whether an adolescent has received any of 19 service types listed (See Table 3.1) in the past 30 days, excluding the present encounter. These 19 service types were then coded based on the following characteristics: number of services used, intensity, and service sector.

Number of services is based on whether the informant (e.g., adolescent/parent/caregiver) responded “Yes” to having used the service types (e.g., emergency department, outpatient therapy, school counselor) listed in Table 3.1. Each positive response for service type was summed to create a count variable for total number of services, with a possible range of 0 to 19 service types used.

Intensity of service utilization is a dichotomous variable that compared the use of less intensive services only (0) to the use of intensive health and mental health-related services (1; including those that use intensive services exclusively or in combination with less-intensive services). This intensity categorization has been previously used when examining racial and ethnic disparities in service utilization with the CDS (Pickens et al., 2017). For example, less-intensive services consisted of services such as outpatient treatment, use of school psychologists, and self-help groups. Intensive services consisted of services such as residential treatment,
inpatient psychiatric unit, and the hospital emergency room. Refer to Table 3.1 to see which services were categorized as intensive vs. less intensive.

Service sectors were categorized based on five separate, dichotomous variables: school, juvenile justice, mental health, general healthcare, and social service sectors, as previously defined in CDS publications (Choi et al., 2018). Each sector category is a dichotomous variable, where a response of “Yes” to any of the services represented was coded as a positive response for the sector used (1). If adolescents did not use any of the services in that sector, they were coded as not having used the sector (0). Refer to Table 3.1 for a list of service types included within each sector category.

**Self-Harm**

The Indictors of Severity of Problems (IOS) and the Clinical Evaluation forms were used to define self-harm among this sample. The IOS is an assessment form used to assess presence of risk behaviors and was developed as part of the NCTSN Core Data Set (CDS). It has been utilized in previous publications utilizing the CDS (Briggs et al., 2012). The IOS tool measures severity of suicidality and self-injurious behaviors (SIB) in the past 30 days on a 3-point scale (2= “very much/often a problem,” 1= “somewhat/sometimes a problem,” 0= “not a problem”). Suicidality was coded as a positive response if adolescents responded “somewhat/sometimes a problem” or “very much/often a problem” to the question “thinking about killing himself/herself or attempting to do so.”

To verify the suicidality variable and to ensure inclusion of all adolescents who experienced some degree of suicidality, the clinical evaluation tool was used in addition to the IOS. The clinical evaluation tool is a separate form used to document an adolescent’s primary behavioral health concerns at the time of their visit by the clinician conducting the clinical assessment. The clinical evaluation tool is used to identify whether the “Child has/exhibits
suicidality?” Responses included “No,” “Probable,” and “Definite.” We coded a positive response to suicidality on the clinical evaluation tool as either “Probable” or “Definite.” We utilized the clinical evaluation alongside the IOS suicidality question to create a composite suicidality variable of those who reported positively to one or both of the suicidality indicators. SIB were defined as a positive response if adolescents responded “somewhat/sometimes a problem” or “very much/often a problem” to the prompt “cutting him/herself, pulling out his/her own hair” on the IOS assessment tool.

We coded the above self-harm items in two different categories. To the purpose of describing our study describe our sample, we created a categorical variable with the following self-harm options: (0) no self-harm, (1) SIB only, (2) suicidality only, and (3) both suicidality and SIB. Each self-harm category was mutually exclusive, meaning if an adolescent was in the SIB only category, they could not be included in the “both suicidality and SIB” category. Groups were created such that when comparing SIB only to the other characteristics in the variable, the comparison group would be no self-harm versus no self-harm in addition to other self-harm categories. For the purpose of regression analyses, we also created a dichotomous categorical variable. For this variable, the self-harm type indicator (e.g., SIB only, suicidality only, both) was SIB and suicidality) coded as (1) and no self-harm was coded as (0).

**Trauma Exposure**

The trauma history profile (THP), adapted from the UCLA PTSD-RI (Steinberg et al., 2004), was utilized to assess lifetime experiences of trauma and other associated characteristics (e.g. trauma type, trauma setting). Information is provided by the child/adolescent, caregiver, and collateral accounts. Trauma history in this study was coded as a count variable and reflected the cumulative number of trauma types (range: 0-20) reported by the survey informant. The following types of trauma exposures were included: Sexual maltreatment/abuse, Sexual
Consistent with Andersen’s model, the key constructs and variables of interest for this study included: predisposing (race/ethnicity, gender), need (self-harm), and service utilization characteristics (sector, intensity, number) (Andersen, 1995; Gelberg et al., 2000; von Lengerke et al., 2014). Age and trauma exposure were utilized as control variables. Age was included in the model, as the overall relationships for this age group (adolescents) is the primary aim of the research question(s). Given that our sample is all trauma-exposed, we included trauma exposure (number of trauma exposures endorsed) as a covariate.

NCTSN center-level effects, a variable that accounts for the different types of clinics and centers that are represented in the dataset, was adjusted for in the services use analyses. This variable has been utilized in previous studies utilizing the NCTSN data set and controls for potential clustering effects by each center (e.g., assumes that characteristics will be similar for participants seen at the same site) (Layne et al., 2014). The purpose of using multilevel modeling is to be able to relate findings to all adolescents in the NCTSN CDS, not just those in centers with the most cases.

**Data Analysis**

All analyses were performed using STATA Version 16. We utilized the default settings in STATA for all analyses, which utilizes listwise deletion. Demographic characteristics and variables of interest were examined through descriptive statistics. Pearson correlation...
coefficients between the predictor variables and correlates were examined prior to regression analyses.

Next, we used one-way ANOVA to examine differences between racial and ethnic groups regarding self-harm and service utilization. Negative binomial (total number of services used) and logistic regression analyses (intensity, sector) were used to examine service utilization. Regression models were built by examining each set of predictor variables (Step 1: self-harm; Step 2: race/ethnicity, gender) separately before fitting a regression model with all the predictors and covariates. New sentence here which resulted in our main effects models (Step 3: self-harm, gender, race/ethnicity). We then added the predictors and their interactions in the models for the final model with interaction effects (Step 4: self-harm*race/ethnicity; self-harm*gender). We accounted for random effects associated with the NCTSN centers by using multilevel modeling (i.e., mixed, logistic), as has been done in previous publications using the NCTSN CDS (Kiser et al., 2014; Layne et al., 2014). Post-hoc tests were conducted using postestimation commands (i.e., margins, marginsplot) to explore the significant interaction effects, determine predicted mean values for each group represented in the interaction (e.g., self-harm present*Hispanic, self-harm present*gender) and determine differences within race/ethnicity and gender groups with self-harm present. Significance was set at $\alpha = .05$.

Results

Participant Demographic Characteristics

The total sample used for the present analyses ($N=4,980$) was on average 14.9 years old ($SD=1.6$) and the majority were female (57.7%; $n=2,875$). Hispanic adolescents accounted for (41.4%; $n=2,062$), followed by NH White adolescents (34.6%; $n=1,725$), and NH Black adolescents (24.0%; $n=1193$). The majority of the sample was insured with either public, private, or both types of insurance (88.2%; $n=4,391$).
Participant Clinical and Service Utilization Characteristics

Approximately one-third of our sample reported self-harm (31.2%; n=1,556). Self-harm categories included: self-injury only (n=237), suicidality only (n=746), and both self-injury and suicidality (n=573). In Table S3.1 we report any significant differences between racial and ethnic groups regarding self-harm. The mean number of trauma exposure types was 3.8 (SD=2.8), with a range of 0 to 15. The mean total of services accessed in the past 30 days was 2.6 (SD=2.5), with a range of 0 to 18. The most to least accessed (e.g. used at least one service type) service sectors were: mental health (n=2,777; 55.9%), school-based (n=1,977; 40.2%), social services (n=1,633; 32.9%), juvenile justice (n=949; 19.2%), and healthcare services (n=830; 17.6%). Intensive services (with or without less intensive service utilization; n=1,524; 42.6%) were less frequently used when compared to less intensive services only (n=2,052; 57.4%).

Service Utilization Regression Models

Before testing the regression models, we examined Pearson’s correlation coefficients to examine if the independent variables of interest to examine for multicollinearity (Table 2). We also examined whether service utilization differed between racial and ethnic groups. Significant differences (p < .05) were found between racial and ethnic group for each of the service utilization characteristics (Tables S3.1-S3.2).

Model 1: Total Service Utilization: Mixed Effects Multi-Level Negative Binomial Regression

For Step 1, the main effects model fit the data well (χ² (7) = 392.9, p < .001). The presence of self-harm was associated with a significantly higher number of services used (p < 0.001). Hispanic adolescents (p = .002) reported a significantly lower number of services used. The number of serviced used was significantly higher among NH Black adolescents (p = .02)
compared to NH White adolescents. Female adolescents utilized a significantly lower number of services \((p < .001)\) compared to male adolescents. For Step 2, the interaction effects model fit the data well \((\chi^2 (7) = 411.0, p < .001)\) and significant interaction effects were noted for self-harm*race/ethnicity (NH Black: \(\beta = -0.18; p = .01, 95\% CI [-0.31, -0.05])\). No significant interaction effects were found for self-harm*gender.

In a post-hoc analysis exploring the significant interaction effect for Black adolescents, no significant between group racial and ethnic differences (for adolescents with self-harm) were noted. However, White \((\chi^2 (1) = 20.2; p < .001)\) and Hispanic \((\chi^2 (1) = 38.1; p < .001)\) adolescents were significantly more likely to utilize services when displaying self-harm compared to youth not reporting self-harm within their respective racial and ethnic groups. For Black adolescents, there were no significant differences based on self-harm. For additional total service utilization model information, see Table 3.4.

### Model 2: Intensity: Mixed Effects Multi-Level Logistic Regression

For Step 1, the main effects model fit the data well \((\chi^2 (7) = 118.16, p < .001)\). Presence of self-harm significantly increased the likelihood of intensive service utilization \((p < .001)\) compared to adolescents who did not report self-harm types. NH Black adolescents \((p = .03)\) were significantly more likely to utilize intensive services compared to NH White adolescents. For Step 2, the interaction effects model fit the data well \((\chi^2 (7) = 123.06, p < .001)\), but no significant interaction effects emerged for self-harm by race/ethnicity or self-harm by gender. See Table 3.4 for a complete report of estimates in the intensity of service utilization model.

### Models 3-7: Service Sector: Mixed Effects Multi-Level Logistic Regressions

#### Model 3: Mental Health

The main effects model fit the data well \((\chi^2 (7) = 121.33, p < .001)\). The presence of self-harm was associated with a significantly higher likelihood of mental health service utilization \((p\)
< .001). Hispanic adolescents \( (p = .02) \) had a significantly lower odds of mental health service utilization compared to NH White adolescents. Black adolescents did not have a significantly different odds of utilizing mental health services compared to NH White adolescents. Female adolescents \( (p = .02) \) had a significantly lower odds of mental health service utilization. In step 2, the interaction effects model fit the data well \( (\chi^2 (7) = 143.74; p < .001) \) and significant interaction effects for self-harm by race/ethnicity emerged (NH Black adolescents: \( OR = 0.51, p = .002, 95\% CI [0.34, 0.78] \)). No significant interaction effects for self-harm*gender were found.

In a post-hoc analysis exploring the significant interaction effect for Black adolescents who self-harm, between group differences were noted for Black adolescents compared to NH White adolescents who self-harm. Black adolescents who self-harm were significantly less likely to access mental healthcare services \( (\chi^2 (1) = 8.0; p = .01) \). Within their respective racial and ethnic groups, both White \( (\chi^2 (1) = 6.02; p = .01) \) and Hispanic \( (\chi^2 (1) = 30.8; p < .001) \) adolescents were significantly more likely to utilize services when displaying self-harm as opposed to not reporting self-harm. Among Black adolescents, individuals were less likely to utilize services when displaying self-harm \( (\chi^2 (1) = 4.05; p = .04) \) compared to those who did not self-harm. For additional regression model information for mental health service utilization, see Table 3.5.

**Model 4: General Healthcare**

Hispanic adolescents had a significantly lower odds of healthcare service utilization, \( OR = 0.77 (p < .05) \). The presence of self-harm was associated with a significantly higher likelihood of healthcare service utilization, \( OR = 2.03 (p < .001) \). The interaction effects model demonstrated that Hispanic adolescents reporting self-harm had a significantly higher odds of healthcare service utilization, \( OR = 1.47 (p < .05) \). No significant interaction effects emerged for self-harm by gender were observed.
The main effects model fit the data well ($\chi^2 (7) = 125.69, p < .001$). The presence of self-harm was associated with a significantly higher likelihood of healthcare service utilization ($p < .001$). Hispanic adolescents ($p = .03$) had a significantly lower odds of healthcare service utilization compared to NH White adolescents. Black adolescents did not have a significantly different odds of utilizing healthcare services compared to NH White adolescents ($p = .47$).

Female adolescents did not have a significantly lower or higher odds of healthcare service utilization ($p = .87$). In step 2, the interaction effects model fit the data well ($\chi^2 (7) = 129.55, p < .001$) and significant interaction effects self-harm*race/ethnicity were noted (Hispanic adolescents: $OR = 1.55, p = .02, 95\% CI [1.07, 2.24]$). No significant interaction effects emerged for self-harm by gender. In a post-hoc analysis exploring the significant interaction effect for Hispanic adolescents who self-harm, no significant differences in healthcare service utilization were found between-racial ethnic groups of adolescents who self-harm. However, significant within race/ethnicity group differences were noted when comparing service utilization by self-harm. Within their respective racial and ethnic groups, NH White ($\chi^2 (1) = 25.26; p < .0001$), Hispanic ($\chi^2 (1) = 44.55; p < .001$), and Black ($\chi^2 (1) = 11.53; p = .001$) adolescents were significantly more likely to utilize healthcare services when displaying self-harm as opposed to not reporting self-harm. For additional regression model information for general health service utilization, see Table 3.5.

**Model 5. School-Based**

The main effects model fit the data well ($\chi^2 (7) = 97.67, p < .001$). Self-harm types were associated with a significantly higher likelihood of school-based service utilization ($p < .001$). No significant differences in school-based service utilization emerged by racial and ethnic group. By gender, female adolescents ($p < .001$) had a significantly lower odds of school-based service utilization. In step 2, no significant interaction effects were observed for race/ethnicity by self-
harm or gender by self-harm. Additional regression model information for school-based service utilization are presented in Table 3.6.

**Model 6. Juvenile Justice**

The main effects model fit the data well ($\chi^2 (7) = 187.30, p < .001$). The presence of self-harm did not correspond with a significantly greater or lower likelihood of being placed in juvenile justice services ($p = .13$). Hispanic adolescents ($p = .51$) did not have a significantly greater or lower likelihood of juvenile justice services compared to NH White adolescents. Black adolescents did have a significantly greater odds of juvenile justice services use compared to NH White adolescents ($p = .03$). Female adolescents ($p < .001$) had a significantly lower odds of juvenile justice services. In step 2, no significant interaction effects were observed for race/ethnicity*self-harm or gender*self-harm. Results can be found in Table 3.6.

**Model 7: Social Services**

The main effects model fit the data well ($\chi^2 (7) = 231.93, p < .001$). The presence of self-harm corresponded with a significantly higher likelihood of accessing social services ($p = .004$). Hispanic adolescents ($p = .01$) had a significantly lower odds of social service utilization compared to NH White adolescents. Black adolescents did not have a significantly lower or greater odds of social service utilization compared to NH White adolescents ($p = .06$). Female adolescents ($p < .001$) had a significantly greater odds of social service utilization. In step 2, the interaction effects model fit the data well ($\chi^2 (7) = 240.66 p < .001$) and significant interaction effects self-harm* race/ethnicity were noted (Hispanic adolescents: $OR = 1.40; p = .05$, 95%CI [0.99, 1.90]). No significant interaction effects for self-harm*gender. In a post-hoc analysis exploring the significant interaction effect for Hispanic adolescents who self-harm, no significant between group differences were noted for any racial and ethnic group. NH White ($\chi^2 (1) = 5.73; p = .02$) and Black ($\chi^2 (1) = 10.1; p = .002$) adolescents were significantly less likely to have
accessed social services when displaying self-harm as opposed to not reporting self-harm within their respective racial and ethnic groups. For Hispanic adolescents, no significant differences were noted within racial and ethnic group.

**Discussion**

This study examined ethnic-, racial, and gender-based disparities in service utilization characteristics among a treatment-seeking sample of trauma-exposed adolescents who displayed self-harm-related behaviors. Given the notably low levels of service utilization by adolescents who self-harm, our findings fill a gap by providing the following key findings: (a) Black adolescents have lower levels of mental health service utilization, compared to NH White and Hispanic, and Black adolescents who had histories of self-harm were not more likely to receive mental health services than other Black adolescents; (b) medical healthcare services, such as primary care and emergency services are more readily accessed than other types of healthcare services by adolescents from all racial and ethnic groups, and (c) school-based services may represent an accessible option for obtaining and accessing mental healthcare across racial and ethnic groups.

Of particular concern is the finding that Black adolescents who presented with self-harm compared to those who did not present with self-harm were not more likely to receive mental healthcare services, and they were significantly less likely to use mental health services compared to NH White adolescents who also had self-harm types. Our findings align with previous studies examining service utilization for self-harm types between racial and ethnic groups, self-harm types did not predict higher rates of mental health service utilization for Black adolescents (Freedenthal 2007; Nestor et al., 2016; Wu et al., 2010). Additionally, this sample is from a group of adolescents who were treatment-seeking, thus rates may be even lower among community-dwelling samples. One explanation, since there were no significant differences in
health service utilization for Black adolescents with respect to self-harm status in our sample, may be that referrals and access to specialized mental healthcare services such as outpatient therapy, residential treatment, and day treatment programs may be deemed as more warranted by other symptom presentation factors in addition to a self-harm type for Black adolescents. For example, studies have shown NH Black adolescents were less likely to be identified and encouraged to seek services for internalizing disorders compared to NH White adolescents (Alegria et al., 2012). Black adolescents have also been noted to be more likely to receive services for externalizing symptoms (Gudiño et al., 2009; Martinez et al., 2013), which may be indicative of clinician biases regarding which symptoms constitute need for mental health treatment among Black adolescents. In addition, once a need is identified, attention to where Black adolescents are referred is necessary. Specifically, if these settings are involuntary such as juvenile justice system services, or voluntary, therapeutic services such as outpatient mental health treatment. Thus, future studies may examine under what symptom presentations are Black adolescents seeking care for self-harm types, referring clinician characteristics and which services do they get referred to/access with the corresponding symptom presentation.

General healthcare service utilization significantly increased for Hispanic, Black, and White adolescents when self-harm types were present. These findings suggest that healthcare service access (emergency room, primary care) may be more readily accessible across access barriers faced by adolescents from racial and ethnic minority groups who present with self-harm. This finding also makes sense in the context of previous studies identifying non-specialty healthcare services as more readily accessible for Black and Hispanic adolescents (Alegria et al., 2002; Wang et al., 2006). Given that healthcare service utilization was more likely among adolescents who self-harm, this also underscores the importance of having integrated behavioral
health programs in primary care settings to address unmet mental health needs and prevent suicide (Bridges et al. 2014). Future studies should develop and evaluate strategies for addressing self-harm types in healthcare settings specifically for adolescents from racial and ethnic minority groups.

School-based settings may represent a more accessible option for seeking and receiving care for self-harm types, as adolescents with self-harm types across racial and ethnic group reported a higher likelihood of using services that did not differ significantly between racial and ethnic group. This finding aligns with previous studies examining mental healthcare use between racial and ethnic groups, where school-based services were the only service category (compared to inpatient and outpatient mental healthcare) where racial and ethnic disparities were not reported (Wu et al., 2010). However, pathways to accessing school-based mental health services, and the specific types of services offered to Black and Hispanic adolescents who self-harm require further investigation (Green et al., 2020). For example, a recent study found school-based mental health services accessed for Black and Hispanic youth differed significantly by type, such that Black and Hispanic youth were less likely to initially access more targeted services such as counseling, and instead placed in more restricted settings such as separate classrooms or schools (Green et al., 2020). Thus, future studies should examine under what circumstances are Black and Hispanic adolescents more likely to utilize specific types of school-based healthcare services. Individual-level factors such as involvement in extracurricular activities were significantly related to using school-based health services (Wu et al., 2010). Additional future studies should also examine the school environment, such as the availability of school-based mental health resources and the presence of law enforcement officers, as contributors to which services are accessed and for whom (Mann et al., 2019).
Strengths and Limitations

The current study is not without limitations. In the dataset used for this study, we only had access to service utilization for a 30-day period prior to data collection, which does not capture the full range of services that may have been used for symptoms preceding the identification of self-harm. Future research should incorporate longitudinal methods that facilitate investigation of more comprehensive patterns of service utilization over time to illuminate adolescents’ use of services before, during, and after self-harm types arise. However, this may also be viewed as a strength; self-harm was assessed for the previous 30 days, which coincided with the 30 days of previous service utilization, providing a snapshot of what services were used in context of a recent self-harm type.

Additionally, there are limitations related to our variable creation for self-harm, race/ethnicity, and gender. When examining for gender differences in service utilization, it is imperative for future studies to prioritize understanding these differences by capturing the spectrum of diverse gender identities, not just male and female categories. Gender minority adolescents (e.g., transgender, non-binary, questioning) have higher rates of suicide attempts than other adolescents (Jackman et al., 2021), and their pathways to treatment may be distinct from those of their cis-gendered peers. For analysis of race and ethnicity distinctions, we were limited by low sample size in particular subgroups (e.g., Native American, Asian) and unable to conduct subgroup analyses (e.g. Cuban vs. Mexican, Caribbean vs. African American, immigrant status). In a similar vein, the sample size for Black adolescents is smaller than those of NH White and Hispanic adolescents and thus power to detect effects for Black adolescents may have been limited. Another limitation included lack of variability in insurance status, as the majority of our sample was insured. Thus, our current sample is not generalizable to the service access of adolescents without insurance. Selected variables and data did not facilitate assessment of mental
health concerns other than self-harm. Future research should include additional mental health conditions that may influence service utilization between and within racial and ethnic groups and move beyond examining race/ethnicity as a predictor. Some examples of examining other relevant factors beyond race and ethnicity as predictors include specific subgroup factors as listed above (e.g., nationality, immigrant status) as well as characteristics of their lived environment, such as neighborhood resources and state-level policies, that can more specifically inform service access.

Please also note that the analytic strategies and results for the publication version of these findings will be slightly different from those noted in the Method and Results sections. Specifically, we will adhere to the NCTSN protocol of selecting children and adolescents with at least one identified trauma type to reduce the likelihood of misinterpreting missing data as equal to zero trauma exposures. Preliminary analyses using this method suggests that the overall direction of the findings are the same but some of the sample sizes and parameter estimates differ slightly.

This study also has several strengths. The advantages of this dataset include a sufficiently large and diverse clinical sample of treatment-seeking adolescents from across the U.S. with self-harm types, an under-documented clinical concern especially among adolescents from racial and ethnic minority groups. In addition, the dataset includes robust accounts of service utilization characteristics including service sectors such as health services, mental health, and school-based health services.

Conclusion

The findings from this study contribute to the existing literature on service utilization among adolescents who self-harm. We investigated how self-harm characteristics, gender, race,
and ethnicity are associated with engagement in service utilization among a sample of trauma-exposed, treatment-seeking adolescents. Our findings suggest limited access to available mental health services among Black adolescents who have self-harm types. However, accessing care for self-harm types was more likely in the general healthcare service sector for both Hispanic and Black adolescents. These findings may be due to barriers such as availability of mental health providers in communities of Black and Hispanic adolescents and long waitlists for accessing mental health-specific services. Thus, future research should investigate the pathways through which adolescents at risk for suicide can successfully connect to mental health-specific services, including school-based services. Clinicians working with adolescents who self-harm should be aware of the unique needs of Hispanic and Black adolescents to ensure that they receive referrals and subsequently connect to assessment, diagnostic, and treatment resources that will comprehensively address their self-harm types and prevent related suicide attempts and chronic mental health morbidity.
Table 3.1. Service Utilization Characteristics

<table>
<thead>
<tr>
<th>Service utilization Variable</th>
<th>Service Types Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Services (0-19)</td>
<td>Inpatient psychiatric unit, Residential treatment center, Detention center, training school, jail, prison, Group home, Treatment foster care, Probation officer, court counselor, Day treatment program, Case management, care coordination, In-home counseling, Outpatient therapy, Outpatient psychiatrist treatment, Primary care for trauma-related symptoms, School counselor, psychologist, social worker, Special class or special school, Child welfare, Dept. of social services, Foster Care, Therapeutic recreation service or mentor, Hospital emergency room, Self-help group)</td>
</tr>
</tbody>
</table>
| Intensity (Mental Health-related services) | **Intensive**: inpatient psychiatric unit or hospital for mental health problems, residential treatment center, intensive group, day treatment program, hospital emergency room, in-home counseling  
**Non-intensive**: case management/care coordination, outpatient therapy other than at present clinic, outpatient treatment (psychiatrist), primary care physician, school counselor/psychologist, special class or special school, therapeutic recreation services or mentor, self-help groups |
| School (2) | School counselor/psychologist/social worker, special classes or school |
| Juvenile Justice (2) | Probation officer/court counselor, detention center/jail/prison/training school |
| Mental Health (8) | Inpatient psychiatric unit, Residential treatment center, Day treatment program, In-home counseling, Group Home, Outpatient therapy, Outpatient psychiatrist, Case management/care coordination |
| Health Care (2) | Hospital emergency room, primary care provider |
| Social Services (3) | Foster care, Child welfare/department of social services, treatment foster care |

*Note. 18 services are represented, not 19 in service sectors. Self-help was not included in the service sectors.*
Table 3.2. Sample Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>All (N=4,980)</th>
<th>Self-harm (n=1,556)</th>
<th>No self-harm (n=3,424)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (12-17)</td>
<td>14.9 (1.6)</td>
<td>15.1 (1.6)</td>
<td>14.8 (1.7)</td>
</tr>
<tr>
<td>Sex: Female</td>
<td>2875 (57.7)</td>
<td>1065 (68.4)</td>
<td>1810 (52.9)</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH White</td>
<td>1725 (34.6)</td>
<td>651 (41.8)</td>
<td>1074 (31.4)</td>
</tr>
<tr>
<td>NH Black</td>
<td>1193 (24.0)</td>
<td>288 (18.5)</td>
<td>905 (26.4)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2062 (41.4)</td>
<td>617 (39.7)</td>
<td>1,445 (42.2)</td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4,391 (88.2)</td>
<td>1,354 (87.0)</td>
<td>3,037 (88.7)</td>
</tr>
<tr>
<td>No</td>
<td>589 (11.8)</td>
<td>202 (13.0)</td>
<td>387 (11.3)</td>
</tr>
<tr>
<td>Trauma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of trauma types</td>
<td>3.8 (2.8)</td>
<td>4.4 (3.1)</td>
<td>3.5 (2.7)</td>
</tr>
</tbody>
</table>

Service utilization Characteristics

| Total Services Used (Range 0-18) | 2.6 (2.5) | 3.2 (2.8) | 2.4 (2.3) |
| Intensive Health Services (n=3,576) | 1524 (42.6) | 663 (53.7) | 861 (6.8) |
| Mental Health (n=5,784) | 2777 (55.9) | 1016 (65.4) | 1761 (51.6) |
| Healthcare (n=5,507) | 830 (17.6) | 396 (26.5) | 434 (13.5) |
| Social Services (n=5,791) | 1,917 (31.3) | 505 (32.5) | 1,128 (33.0) |
| School-based (n=4920) | 1,977 (40.2) | 721 (47.0) | 1,256 (37.1) |
| Juvenile Justice (n=4947) | 949 (19.2) | 289 (18.7) | 660 (19.4) |

Table 3.3. Pearson Correlation Coefficients with Variables of Interest

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<tbody>
<tr>
<td>1. Total Services</td>
<td>--</td>
<td></td>
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<td>2. Intensive services</td>
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<td></td>
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<td>3. School</td>
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<td>4. Juvenile Justice</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>5. Mental Health</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td></td>
<td></td>
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<tr>
<td>6. Social Services</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>7. Healthcare</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>8. Age</td>
<td>.11***</td>
<td>.14**</td>
<td>.21**</td>
<td>.12***</td>
<td>.04**</td>
<td>.02**</td>
<td>-.001</td>
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<tr>
<td>9. Trauma</td>
<td>.31***</td>
<td>.17***</td>
<td>.10**</td>
<td>.21</td>
<td>.21</td>
<td>.07**</td>
<td>.16</td>
<td>.12</td>
<td>---</td>
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<tr>
<td>10. Insurance</td>
<td>.15***</td>
<td>.09***</td>
<td>.0004**</td>
<td>.11**</td>
<td>.14</td>
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<td>.07</td>
<td>-.06</td>
<td>.04</td>
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<tr>
<td>11. Self-Harm</td>
<td>.16***</td>
<td>.16**</td>
<td>.01***</td>
<td>.13**</td>
<td>-.005*</td>
<td>.16***</td>
<td>.09*</td>
<td>.08</td>
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<td>-.02**</td>
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<td>12. Gender</td>
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<td>-.03**</td>
<td>.08**</td>
<td>.08**</td>
<td>.02**</td>
<td>.15**</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001
Table 3.4. Service Utilization Models 1-2: Total Service Utilization and Intensity

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Model 1a: Total Services</th>
<th>Model 1b. Services Used (Interactions)</th>
<th>Model 2a. Intensity (Main)</th>
<th>Model 2b. Intensity (Interactions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main effects (n=4,980)</td>
<td>(n=4,223)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td><strong>β</strong></td>
<td><strong>95% CI</strong></td>
<td><strong>OR</strong></td>
<td><strong>95% CI</strong></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.01</td>
<td>-.09, 0.37</td>
<td>0.04</td>
<td>0.02, 0.10</td>
</tr>
<tr>
<td>Age</td>
<td>.03***</td>
<td>0.02, 0.04</td>
<td>1.12***</td>
<td>1.07, 1.18</td>
</tr>
<tr>
<td>Female (ref: male)</td>
<td>-.10***</td>
<td>-.15, 0.06</td>
<td>0.92</td>
<td>0.79, 1.10</td>
</tr>
<tr>
<td>Trauma Exposure</td>
<td>.06***</td>
<td>0.12, 0.23</td>
<td>1.07***</td>
<td>1.04, 1.10</td>
</tr>
<tr>
<td>Insured (ref: no insurance)</td>
<td>.32***</td>
<td>0.12, 0.23</td>
<td>1.54**</td>
<td>1.16, 2.05</td>
</tr>
<tr>
<td>Race/Ethnicity (ref: NH white)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH Black</td>
<td>.08*</td>
<td>0.01, 0.15</td>
<td>1.29*</td>
<td>1.10, 1.67</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.11**</td>
<td>-.18, -0.04</td>
<td>0.96</td>
<td>0.76, 1.22</td>
</tr>
<tr>
<td>SH present (ref: none)</td>
<td>.18***</td>
<td>0.13, 0.23</td>
<td>1.88***</td>
<td>1.59, 2.21</td>
</tr>
<tr>
<td>SH*Race/Ethnicity</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH Black</td>
<td>--</td>
<td>--</td>
<td>---</td>
<td>0.72</td>
</tr>
<tr>
<td>Hispanic</td>
<td>--</td>
<td>--</td>
<td>---</td>
<td>0.47, 1.11</td>
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<tr>
<td>SH*Female</td>
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<td>---</td>
<td>1.33</td>
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<tr>
<td>Site Effects</td>
<td>.14</td>
<td>0.09, 0.21</td>
<td>1.01</td>
<td>0.61, 1.65</td>
</tr>
</tbody>
</table>

Note: NH: Non-Hispanic, SH: Self-harm types, Site effects refers to NCTSN center effects
*p<0.05, **p<0.01, ***p<0.001
## Table 3.5. Service Utilization Characteristics Models 3-4: Mental Health and General Healthcare Sector

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Model 3a. Mental Health (n=5784)</th>
<th>Model 3b. Mental Health</th>
<th>Model 4a. Health Care (n=5507)</th>
<th>Model 4b. Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.39 0.19, 0.76</td>
<td>0.38 0.19, 0.76</td>
<td>0.11 0.05, 0.22</td>
<td>0.11 0.05, 0.24</td>
</tr>
<tr>
<td>Age</td>
<td>1.09*** 1.05, 1.13</td>
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<td>1.01 0.97, 1.06</td>
<td>1.02 0.97, 1.06</td>
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<td>0.82** 0.71, 0.95</td>
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<td>1.06*** 1.03, 1.09</td>
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<td>1.43** 1.06, 1.94</td>
<td>2.12*** 1.81, 2.47</td>
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<td>-- --</td>
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</table>

Note: NH: Non-Hispanic, SH: Self-harm types, Site effects refers to NCTSN center effects
* p<0.05, ** p <0.01, ***p <0.001
Table 3.6. Service Utilization Models 5-7: Non-Healthcare Sectors

<table>
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<td>1.23</td>
<td>1.0, 1.51</td>
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<tr>
<td>NH Black</td>
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<td>.93, 1.35</td>
<td>1.07</td>
<td>0.87, 1.33</td>
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<td>.71, 1.10</td>
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Note: NH: Non-Hispanic, SH: Self-harm types, Site effects refers to NCTSN center effects

*p<0.05, **p<0.01, ***p<0.001
REFERENCES


CHAPTER 4: TRAUMA-RELATED FACTORS ASSOCIATED WITH SERVICE UTILIZATION FOR ADOLESCENTS REPORTING SELF-HARM

Introduction

Self-harm\(^8\) is a priority to address considering increasing prevalence rates. For example, Hispanic (8.1 to 8.9%) and Black (7.9 to 11.8%) adolescents had increases in suicide attempts from 2009 to 2019 (CDC 2021). Adolescents who present with self-harm types may have additional unaddressed psychiatric symptoms and treatment needs related to previous trauma exposure\(^9\) (Ford & Gomez 2015). Despite increased mental health symptom burden, individuals who self-harm have low use of health services across sectors due to factors such as fear of hospitalization, lack of a perceived need for services, or insurance-related factors that serve as barriers to treatment access and engagement (Hom et al., 2015). Further, adolescents from racial and ethnic minority groups who report self-harm types are less likely to seek and receive formal mental health services, compared to non-Hispanic (NH) White adolescents (Nestor et al., 2016; King et al., 2020 Wu et al., 2010) (Michelmore & Hindley, 2012). This is a concerning disparity, as low rates of mental health service utilization complicate appropriate intervention for adolescents with self-harm types as these interventions are designed to prevent further self-harm and/or completed suicide.

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\(^8\) We define self-harm types as thoughts or behaviors to self-harm, regardless of intent. For example, suicidal ideation, attempts, and non-suicidal self-injury. We study these concerns together as they have all been associated with the risk of future suicide attempts.

\(^9\) The National Child Traumatic Stress Network (NCTSN) defines a childhood traumatic event as a “frightening, dangerous, or violent event that poses a threat to a child’s life or bodily integrity” (NCTSN, n.d.).
While several studies have documented racial and ethnic disparities in service utilization for adolescents with self-harm types (Wu et al., 2010; Nestor et al., 2016), less is known about what factors relate to service utilization within racial-ethnic group. Given the extant literature, we expect that trauma exposure and related symptoms contribute to the overall level of mental health need and presentation of the adolescent and thus lead to increased service utilization for adolescents with self-harm types. Trauma exposure and related symptoms have been well-documented among adolescents who engage in self-harm (Ford & Gómez, 2015; Franklin JC, 2017; Turecki & Brent, 2016). Trauma exposure is also associated with increased service utilization within the general population (Kartha et al., 2008) and amongst adolescents (Briggs et al., 2013). This association between trauma and service utilization, however, warrants further consideration among racially-ethnically diverse youth samples (Martinez et al., 2013).

Trauma-related symptoms, which may be more readily observed, may help explain within-group differences in service utilization pathways (Martinez et al., 2013). Several factors, however, may explain differential pathways within diverse racial and ethnic groups such as acculturation status, stigma in seeking mental health treatment, symptom presentation/mental health diagnoses, and increased financial barriers to accessing services (Goldston et al., 2008; Gudiño et al., 2009; Martinez et al., 2013). To further our understanding of some of these complex associations, we explore the roles of trauma exposure and related symptomology (posttraumatic stress symptoms, internalizing, and externalizing symptom presentation) in relation to service utilization.

Background

Andersen’s Behavioral Model for Vulnerable Populations serves as the theoretical foundation for understanding how trauma-related factors (e.g. predisposing, need) may influence individuals’ decisions to seek and utilize health services (Andersen, 1995; Gelberg et al., 2000;
von Lengerke et al., 2014). The model provides a useful theoretical framework for addressing factors at multiple levels as it integrates factors that influence individual behaviors, including risk, symptoms, and service utilization. These factors are categorized into four major components: (a) predisposing (e.g., risk exposures), (b) need (e.g., perceived and evaluated health status), (c) enabling (e.g., barriers and facilitators to services), and (d) service utilization (Andersen, 1995; von Lengerke et al., 2014). Within Andersen’s model, trauma is considered a predisposing factor related to service utilization in vulnerable populations (Gelberg et al., 2000). Trauma exposure corresponds to increased service utilization in the general adult population (Kartha et al., 2008) and adolescents (Briggs et al., 2013; Ystgaard et al., 2009). This model has also been utilized in studies examining service utilization among adolescents with self-harm (Alonzo et al., 2016; LeCloux et al., 2017). Factors such as adolescent inattention symptoms, parent-child relationships, family supports, and public assistance programs have been previously examined in relation to service utilization and in the context of Andersen’s model. These studies found only inattention symptoms among Hispanic adolescents reporting suicidality (Alonzo et al., 2016) and a routine physical for all adolescents reporting suicidality (LeCloux et al., 2017) significantly increased the likelihood of accessing mental health services. Thus, there is a lack of identified factors that associate to service access and use among adolescents at risk for suicide.

Herein, we extend and test the applicability of Andersen’s model in adolescents with self-harm types by focusing on trauma-related predisposing and need factors across and within racial-ethnic groups (White, Black, Hispanic).

**Trauma exposure and service utilization**

Adolescents who self-harm represent a population with high levels of trauma exposure (Castellví et al., 2017; Ford & Gómez, 2015; Liu et al., 2018) and low levels of service utilization (Husky et al., 2012). Among adolescents who self-harm, one international study found
the role of trauma exposures, namely physical abuse and bullying, were associated with service utilization for adolescent girls who engaged in self-harm (Ystgaard et al., 2009). However, the associations between trauma exposure and service utilization are not consistently found across all adolescent samples (Martínez et al., 2013). For example, in a study among youth in the child welfare system, the association between maltreatment exposure and service utilization was not significant within NH White, NH Black, or Hispanic adolescents (Martínez et al., 2013). However, this study focused on a specific subset of trauma exposures, maltreatment types. Additionally, the studies do not examine the association between trauma exposure and service utilization among a U.S.-based sample with self-harm and within racial-ethnic group.

The overlap of access to services for adolescents from racial and ethnic minority groups who are trauma-exposed and self-harm has not been explored. We fill this current gap in the literature and examine the association in the context of clinical need to further contextualize not only whether a high level of trauma exposures increases service utilization, but for what symptom presentations does trauma exposure inform service utilization.

**Trauma exposure, PTSD symptoms, and service utilization**

PTSD symptoms (i.e. intrusion, avoidance, arousal) coincide with self-harm types in adolescents (Ford & Gomez 2015). For example, reexperiencing/intrusion symptoms (e.g. nightmares, flashback episodes) have been associated with the presence of self-harm types (i.e. NSSI); the individual may self-harm in order to detach from negative thoughts (Weierich & Nock 2008). Avoidance/numbing symptoms (e.g. restricted affect, withdrawn) are also associated with engaging in NSSI (Weierich & Nock 2008) and suicidal ideation (Lopez et al., 2020). Hyperarousal symptoms (e.g., difficulty sleeping, angry outbursts, irritability) have also been associated with suicidal ideation among adolescents (Ying et al., 2015). Studies demonstrate that children and adolescents with a PTSD diagnosis are often high users of health
services (Goger et al., 2021). However, as adolescents often do not meet full criterion specified by the DSM-IV to reach a PTSD diagnosis, it is also important to assess by specific posttraumatic stress symptom cluster, which may differentially influence mental health service utilization. For example, avoidance/numbing symptoms may decrease help-seeking behavior to avoid discussing traumatic events that led to their current symptoms. This may be further exacerbated among individuals from racial and ethnic minority populations, where there is stigma regarding suicide and receiving mental health treatment (Brewer et al., 2022; Goodwill & Zhou et al., 2020). Hyperarousal symptoms may present as externalizing symptoms, leading to increased service utilization. Only one study to date examines the associations among PTSD symptom clusters and service utilization among veterans, which found that higher reexperiencing increased prospective service utilization and lower avoidance symptoms predicted lower levels of prospective service utilization (Blais et al., 2014). However, no studies exist examining this association for adolescents who self-harm, a population that displays high levels of PTSD symptoms and low service utilization.

The association between PTSD symptoms and service utilization may differ by and within racial-ethnic group for adolescents who self-harm. PTSD symptom presentations differ by racial-ethnic group (Hall-Clark et al., 2016). For example, Hispanic individuals reported increased arousal (e.g. hypervigilance) and intrusion (intrusive thoughts, flashbacks) compared to White peers (Marshall et al., 2009). Another study found avoidance symptoms were higher compared to the mean scores for arousal and re-experiencing symptoms within a group of Hispanic adolescents (Suarez-Morales et al., 2018). Among young Black males, hyperarousal, specifically hypervigilance, symptoms have been noted to be highly prevalent after violence-related exposure(s) (Smith & Patton, 2016). Thus, PTSD symptoms may differentially influence
receipt of services for adolescents who self-harm, and symptoms characterized as problematic, such as hyperarousal symptoms (e.g., anger and irritability), may be especially likely to associate with service utilization for racial-ethnic minorities. Though a few studies have identified significant mental health needs (e.g., inattention symptoms, conduct disorder) in relation to service utilization within racial-ethnic group (Alonzo et al., 2016; Freedenthal 2007), no studies have focused on the role of PTSD symptoms

**Trauma exposure, emotional and behavioral presentations, and service utilization**

Adolescents with self-harm types often present with other mental health needs in addition to self-harm. An elevated level of internalizing (e.g., depressive symptoms, anxiety, withdrawn, somatic concerns) and/or externalizing (e.g., rule breaking, aggression, inattentiveness) presentations are common among both adolescents who self-harm (Evans et al., 2004; Soto-Sanz et al., 2019; Ljung et al., 2014) and are trauma-exposed (Hicks et al., 2021; Moylan et al., 2010; Renner & Boel-Studt 2017). Although both internalizing and externalizing presentations may accompany self-harm, indicating a need for mental health treatment, each presentation is evaluated with differing priority among adolescents by racial-ethnic group. For example, studies have found that externalizing symptoms, but not internalizing symptoms, were associated with service utilization for Black and Hispanic adolescents, while White adolescents received services for both presentations (Gudiño et al., 2009; Gudiño et al., 2012). Given that adolescents with self-harm types are a population that is commonly missed until concerns amount to severe presentations such as suicide attempts and underutilize services, we investigate whether the identification of clinically significant levels of internalizing or externalizing presentations are associated with an increased receipt of services. Additionally, we examine differences within each racial-ethnic group given the documented disparities in mental health services by race and ethnicity.
Present Study

In this study, we use Andersen’s Behavioral Model among trauma-exposed adolescents with self-harm types to examine how predisposing and need factors influence service utilization within and across racial-ethnic groups (NH White, NH Black, Hispanic, Overall Group). This study has two specific aims. The first aim is to examine the association among trauma exposure (*predisposing factor*) and service utilization. The second aim is to examine the potential pathways and associations between PTSD and emotional/behavioral problems (Model 1) and PTSD symptom clusters, internalizing, and externalizing symptoms (Model 2; *need factors*) with service utilization within and across racial-ethnic groups. We hypothesize the following:

1. Cumulative trauma exposure will be associated with number of services used (a) across and (b) within all racial-ethnic groups. (Null Model)

2. Cumulative trauma exposure will be associated with probable PTSD and emotional/behavioral problems (a) across and (b) within all racial-ethnic groups (Model 1).

3. Cumulative trauma exposure will be associated with each PTSD symptom cluster (B, C, D), internalizing, and externalizing problems (a) across and (b) within all racial-ethnic groups (Model 2).

4. Probable PTSD and emotional/behavioral problems will each be associated with number of services used for (a) across racial-ethnic groups and (b) for White adolescents only (Model 1).

5. Emotional/behavioral presentations indicative of problem behavior severity (i.e., externalizing symptoms, hyperarousal symptoms such as inattention and anger) will be the only psychiatric need factors uniquely associated with services used for NH Black and Hispanic adolescents (Model 2).
Methods

Design and Sample

We utilized baseline data from the Core Data Set (CDS), a national dataset of trauma-exposed, treatment-seeking youth (ages 0 to 21), maintained by the National Center for Child Traumatic Stress at Duke University to conduct the current secondary data analyses. Data from the CDS were collected from 2004 to 2010 as part of a quality improvement initiative. The CDS has data on 14,088 youth who received assessment and/or treatment at a NCTSN-affiliated clinics/centers in the United States. Data collected includes demographics, trauma history profiles, symptoms, and service system use using a combination of self-report, parent/caregiver-report, and clinician evaluation data. Details regarding the NCTSN procedures for collecting data and maintaining the dataset have been described elsewhere (Steinberg et al., 2014). The original study obtained Institutional Review Board (IRB) approval from Duke University Health System and other participating sites. For the current study, a data use agreement was approved by Duke University Health System and the University of North Carolina at Chapel Hill to obtain a dataset with the present subsample. For the current study, the sample consists of adolescents (12-17) who reported self-harm ($N = 1,578$). Adolescents who had missing data on self-harm questions were excluded.

Measures and Variable Construction

Predisposing Factors

Demographics. Data were collected on age, sex, race, and ethnicity. Sex is categorized as male or female. Race and ethnicity are categorized as non-Hispanic (NH) White, NH Black, and Hispanic.
**Trauma Exposure.** Trauma history profile (THP) is adapted from the UCLA PTSD-RI (Steinberg et al., 2004) identifies trauma experience type and characteristics. The THP is utilized at baseline assessment to assess lifetime experiences of trauma and related characteristics of these experiences (e.g. type, setting). Information is provided by the child/adolescent, caregiver, and collateral accounts. Trauma exposure history in this study is assessed as a count variable, reflecting the reported cumulative number of exposure types (0-20). The following types were included in the count: Sexual maltreatment/abuse, Sexual assault/rape, Physical maltreatment/abuse, Physical assault, Emotional abuse/psychological maltreatment, Neglect, Domestic violence, War/Terrorism/Political Violence (US), War/Terrorism/Political Violence (outside US), Illness/Medical Trauma, Serious injury/accident, Natural Disaster, Kidnapping, Traumatic loss or bereavement, Forced Displacement, Impaired Caregiver, Extreme Interpersonal Violence (other), Community violence (other), School violence (other), Other trauma (not otherwise noted).

**Enabling factors**

**Insured Status.** Insurance information (i.e., if insured, type of insurance) was collected through the demographic form at baseline. As most of the sample reported public insurance, we operationalized a positive response to insured status as the presence of any type of insurance, and a negative response as having no insurance reported (i.e., neither public or private insurance).

**Need Factors**

**Self-Harm.** To define self-harm among our sample, we utilized the Indictors of Severity of Problems (IOS) form and the Clinical Evaluation Tool from the baseline assessment data. The IOS is an assessment tool to assess presence of risk behaviors, developed for the NCTSN Core Data Set and has been utilized in previous publications (Briggs et al., 2012). The tool measures
severity of suicidality and NSSI on a 3-point scale ("somewhat/sometimes a problem, “very much/often a problem,” “not a problem”) in the past 30 days. Suicidality is operationalized as a positive response if they responded “somewhat/sometimes a problem” or “very much/often a problem” to the prompt “thinking about killing himself/herself or attempting to do so.” Self-injurious behaviors (SIB) were operationalized as a positive response if they responded “somewhat/sometimes a problem” or “very much/often a problem” to the prompt “cutting him/herself, pulling out his/her own hair.

To further verify the suicidality variable above and to ensure inclusion of all adolescents who experienced some level of suicidality, the Clinical Evaluation Form was also used in addition to the IOS to create a suicidality category. The Clinical Evaluation Form is a separate form used to document the primary behavioral health concerns and clinical observations at the time of visit by the clinician conducting the assessment. Suicidality is one of the concerns listed on the form and was utilized alongside the IOS suicidality variable to create a composite suicidality variable of those who reported positively to both or either suicidality indicators. The Clinical Evaluation Form measures suicidality by asking “Child has/exhibits this problem?” to the clinician, to which they can respond “No,” “Probable,” and “Definite.” We defined a positive response to suicidality on the Clinical Evaluation Form as either “Probable” or “Definite” responses. We coded the above self-harm items as a dichotomous categorical variable, with any type of self-harm variable coded as (1) and no self-harm reported coded as (0).

**PTSD Symptoms.** UCLA Child/Adolescent Posttraumatic Stress Disorder Reaction Index (UCLA-PTSD RI) is a 22-item self-report, validated measure to determine the range of PTSD symptoms present in the previous 30 days. In this study, we utilize the measure to examine the presence of clinically significant PTSD symptom clusters based on the DSM-IV:
criterion B (intrusion/reexperiencing), C (avoidance/numbing), and D (hyperarousal). The PTSD-RI uses a 5-point, Likert-type scale response for each item, with 0= none of the time to 4= most of the time. Those who score a 2 or greater on a symptom received a positive response for that item. To meet PTSD B criterion, at least one symptom must be present. For PTSD C criterion, at least three symptoms must be present, and for PTSD D, at least two symptoms must be present. We operationalized each PTSD symptom cluster as 0=did not reach clinical significance or 1=symptom cluster present.

We also examined overall PTSD symptoms as a proxy for probable PTSD. Those who scored ≥ 38 on the total scale, were based on previous studies, considered to be likely to have full PTSD. We used a dichotomous variable to examine PTSD (0=did not reach clinical significance; 1= ≥ 38 on the total scale). Previous studies have shown sound psychometric properties among diverse samples (Steinberg et al., 2004; Steinberg et al., 2013). A previous publication using the CDS reported good to excellent internal consistency (α = .88–.91) across racial and ethnic diverse youth groups (Steinberg et al., 2013).

**Externalizing/Internalizing Symptom Presentations.** We utilized the Child Behavior Checklist (CBCL), a 113-item caregiver-reported measure examining problem behaviors and mental health concerns in the past 6 months for the child/adolescent. Each question is scored on a 3-point Likert-type scale ranging from 0 (not true) to 2 (often true). The measure can be scored to examine, internalizing and externalizing symptoms subscale scores, and a total scale score. Studies utilizing the measure demonstrate acceptable reliability and validity (through clinician report) among racially and ethnically diverse adolescent samples (Achenbach & Rescorla 2001). We operationalized each subscale and total scale score as dichotomous (i.e., clinically significant versus normative; T-score >60).
Outcomes

Service Utilization. At the baseline assessment, multiple informants (i.e. parent/caregiver, adolescent, clinician) filled out the “Services Received” form. This form asks if the adolescent has received any of the 19 service types (refer to Table 1), apart from the current visit, during the past 30 days. Number of services is based on whether they responded “Yes” to having used the service types listed above. Each positive response for service types were summed to create a count variable for total number of services, with a possible range of 0 to 19 service types used.

According to Andersen’s model, the key constructs and variables for this study include: predisposing (race/ethnicity and trauma history), need (PTSD (overall and symptoms), emotion/behavior concerns (externalizing and internalizing)), and service utilization (total number of services used) (Gelberg et al., 2000). Age and gender will be utilized as control variables in the predisposition category, as previously conceptualized by other studies examining service utilization among adolescents (Alexandre et al., 2008). Additionally, we anticipate adolescents who are older may report a higher number of trauma exposure. Gender is also an important variable to control for when assessing self-harm, as girls tend to have higher rates of suicidal ideation and attempts, although boys are more likely to complete suicide (Canetto & Sakinofsky, 1998). We also controlled for insurance status when testing the overall group service utilization models to account for variability between the racial and ethnic groups.

Analysis Plan

To characterize the sample, we used Statistical Package for the STATA Version 16 (StataCorp, 2019) for data cleaning and deriving descriptive and between-group comparisons for the demographics and key variables. We also examined zero-order correlations among trauma
exposure, self-harm, psychiatric symptoms (PTSD symptoms, emotional and behavioral problems), and service utilization variables as preliminary step to conducting the path analyses.

To build and test our path models, we utilized MPlus 8.4 (Muthen & Muthen, 2018). We built the path model in a sequential manner, starting with testing Hypothesis 1 to examine the main effect of cumulative trauma exposure on services used, while controlling for age, gender, and insurance status (Step 1). For Model 1, we added to the null model by accounting for the role of posttraumatic stress symptoms emotional/behavioral presentations (Hypotheses 2 and 4). Next, we tested Model 2, which is the null model with the addition of specific PTSD symptom clusters (B, C, D) and presentations (internalizing, externalizing; Hypotheses 3 and 5). Although we tested for psychiatric symptoms in each model, we conducted two separate models as Model 1 utilizes the total scale scores for the PTSD-RI and CBCL to examine overall likelihood of having PTSD and emotional/behavioral problems overall, and Model 2 utilizes the subscales from these measures to examine specific symptom clusters and presentations. We conducted this process for the overall group and for each racial-ethnic group for a total of 12 models. At each step, we examined the following model fit statistics: comparative fit index (CFI) > 0.95 (Hu & Bentler 1999), root mean square error of approximation (RMSEA) < 0.05 for close fit and between .05 to .08 (Browne & Cudeck 1993) indicating reasonable fit to examine if the addition of need factors resulted in reasonable model fit indices to proceed and examine the parameter estimates between each variable of interest. We did not explore mediating effects as a precaution given the data are cross-sectional and temporal precedence cannot be established between psychiatric symptoms/presentation and service utilization as both are within 30 days).

For missing values, the default setting (maximum likelihood) was used to maintain as many cases as possible for each analysis as opposed to listwise deletion. We report missing data
patterns in the supplementary materials (Table S1). The present sample size(s) are over the recommended 10 participants per parameter estimate for the overall group model (N=1578), NH White (n=659), NH Black (n=294), and Hispanic (n=625), indicating sufficient power for the present analyses (Kline, 2015). We reported the unstandardized model results for each parameter estimate.

**Results**

**Participant Characteristics**

Adolescents who displayed some level of self-harm, reported race-ethnicity (either NH White, NH Black, or Hispanic), and had data for the outcome service utilization (N=1578) were included in the total sample. Adolescent’s ages ranged from 12-17, with mean age of 15.1 (SD=1.6) years. Female participants composed much of our sample (68.8%; n=1086). The sample consisted of NH White adolescents (41.7%; n=659), followed by Hispanic adolescents (39.6%; n=625), and NH Black adolescents (18.6%; n=294). The mean total number of services used were 3.2 (SD=2.8; range 0-18). Most participants (87.1%; n=1374) reported being insured. The mean number of types of trauma exposures was 4.4 (SD=3.1; range 0-15). Probable PTSD (45.0%; n=533) and overall display of clinically significant emotional and behavioral problems (72.0%; n=801) were prevalent in this sample, and significantly associated with each other (r = .13, p < .01). Refer to Table 2 for additional demographic and clinical characteristics of the study sample within each racial-ethnic group. See supplemental materials section for between racial-ethnic group differences for each clinical characteristic and service utilization.

**Model Testing**

As a preliminary step to examining the proposed path models, we examined the correlations for the main associations, trauma exposure and total service utilization (r = .30, p < .001), trauma exposure with need factors (probable PTSD: r = .13, p < .001;
emotional/behavioral health concerns: \( r = .13, p < .001 \), and need factors and service utilization (probable PTSD: \( r = .05 \), non-significant \( p \) value; emotional and behavioral problems: \( r = .12, p < .01 \)). Refer to Table 4.3 for additional correlation analyses for the PTSD symptoms, internalizing, and externalizing subscales with variables of interest. Refer to Tables S4.1-S4.3 for within racial-ethnic group correlations (Appendix C).

**Null Model: Hypothesis 1: Cumulative Trauma Exposure and Total Number of Services Used**

**Overall.** Model fit was reasonable for the overall model (\( RMSEA = .05, CFI = .98, X^2(1, n=1578) = 5.19, p = .02 \)). Thus, we proceeded to examine the parameter estimates. The pathway from trauma exposure to service utilization, while controlling for age, gender, and insurance, was significant for the overall group (\( b = 0.25, p < .001, SE = 0.02, 95\% CI [0.21, 0.30] \)). Refer to Figure 4.1 for a graphic representation of these results.

**Within racial and ethnic groups.** Model fit was reasonable for the NH White (\( RMSEA = .07, CFI = .96, X^2(1, n=659) = 4.01, p = .05 \)), NH Black (\( RMSEA = .00, CFI = 1.00, X^2(1, n=294) = 0.04, p = .85 \)), and Hispanic (\( RMSEA = .04, CFI = .99, X^2(1, n=625) = 2.23, p = .14 \)). The pathway from trauma exposure to service utilization, while controlling for age, gender, and insurance, was significant for within NH White (\( b = 0.23, SE = 0.03, p < .001, 95\% CI [0.16, 0.30] \)), NH Black (\( b = 0.32, p < .001, SE = 0.05, 95\% CI [0.22, 0.42] \)) and Hispanic (\( b = 0.23, p < .001, SE = 0.03, 95\% CI [0.17, 0.30] \)) adolescents. Refer to Figure 4.1 for a graphic representation of these results.

**Model 1: Hypothesis 2: Cumulative Trauma Exposure to PTSD and Emotion/Behavior Problems**

**Overall.** Model fit was reasonable for Model 1 (\( RMSEA = .05, CFI = .96, X^2(4, n=1578) = 17.41, p = .002 \)). The pathway from trauma exposure to each need factor was significant
probable PTSD ($b = 0.02, p < .001, SE=.01; 95\% CI [0.01, 0.03])]; emotional and behavioral health concerns ($b = 0.02, p < .001, SE=.004, 95\% CI [0.01, 0.03])].

Within racial and ethnic groups. Model fit is reasonable within each racial-ethnic group NH White ($RMSEA=.03, CFI=.99, X^2(4, n=659)= 5.70, p = .22$) and NH Black ($RMSEA=.03, CFI=.98; X^2(4, n=294)= 4.94 p = .29$). For Hispanic adolescent, model fit did not meet the set threshold of a CFI value greater than 0.95 ($RMSEA =.07, CFI =.92, (X^2(4, n=625)= 15.56, p = .004$). Trauma exposure was associated with the presence of emotional and behavior problems for all racial-ethnic groups, NH White ($b = 0.01, p < .05, SE=.006, 95\% CI [0.002, 0.025])$, NH Black ($b = 0.03, p < .05, SE = .01, 95\% CI [0.002, 0.05])$, and Hispanic ($b = 0.02, p < .05, SE=.01, 95\% CI [0.001, 0.03]$). Trauma exposure was associated with the presence of probable PTSD for Hispanic adolescents only ($b = 0.02, p < .01, SE=.01, 95\% CI [0.01, 0.04]$).

Model 1: Hypothesis 4: PTSD, Emotion/Behavior Problems, and Total Number of Services Used

Overall. For the overall group, Probable PTSD was not significantly associated with service utilization ($b = 0.29, SE =.16, 95\% CI [-0.02, 0.60]$). However, emotional/behavioral problems ($b = 0.55, p < .01, SE=.19, 95\% CI [0.19, 0.92]$) were positively associated with service utilization.

Within racial and ethnic groups. Emotional/behavioral problems and its connection to service utilization resulted in a significant path for NH White adolescents only ($b = 0.97, p < .01, SE =.32, 95\% CI [0.34, 1.58]$). Probable PTSD was associated with increased service utilization ($b = 0.62, p < .001, SE =.23, 95\% CI [0.17, 1.07]$) for Hispanic adolescents only. Significant parameter estimates for the path between trauma exposure and service utilization, covariates (age, gender, insurance), and a graphic representation of paths for each examination of Model 1 (overall, within racial-ethnic group) can be found in Figure 4.2.
Model 2: Hypothesis 3: Cumulative Trauma Exposure and PTSD Symptom Clusters, Internalizing/Externalizing Presentations

**Overall.** Model fit was reasonable for the overall model \((RMSEA = .05, CFI = .97, \chi^2 (12, n=1578) = 51.09, p < .001)\). Each path from cumulative trauma exposure to PTSD symptom clusters, internalizing, and externalizing presentations was statistically significant, intrusion \((b = 0.01, p < .01, SE = 0.003; 95\% CI [0.003, 0.02])\), avoidance \((b = 0.01, p < .01, SE = 0.004; 95\% CI [0.003, 0.02])\), arousal symptoms \((b = 0.01, p < .05, SE = 0.003; 95\% CI [0.002, 0.02])\), internalizing \((b = 0.01, p < .05, SE = 0.01; 95\% CI [0.002, 0.02])\), and externalizing \((b = 0.02, p < .001, SE = 0.01; 95\% CI [0.02, 0.03])\) symptoms.

**Within racial and ethnic group.** Model fit was reasonable for NH White \((RMSEA = .05, CFI = .96, \chi^2 (12, n=659) = 34.60, p = .001)\), NH Black \((RMSEA = .04, CFI = .97; \chi^2 (12, n=294) = 18.52, p = .10)\), Hispanic \((RMSEA = .04, CFI = .97, \chi^2 (12, n=625) = 25.43, p = .01)\) for at least one of the prespecified model fit criteria. Intrusion and avoidance symptom clusters, as well as internalizing symptoms, did not have a statistically significant association to service utilization for any racial-ethnic group. Arousal symptom cluster \((b = .75, p < .05, SE = .38, 95\% CI [0.02, 1.49])\) was associated with increased service utilization for Hispanic adolescents only. Externalizing emotional/behavior problems were associated with increased service utilization for NH White \((b = 1.24, p < .001, SE = .29; 95\% CI [0.67, 1.81])\) and Hispanic adolescents \((b = 0.87, p < .01, SE = .27; 95\% CI [0.35, 1.39])\).

Model 2: Hypothesis 5: PTSD Symptom Clusters, Internalizing/Externalizing Presentations, and Total Number of Services Used

**Overall.** Intrusion, avoidance, or arousal symptom clusters did not have a statistically significant association to service utilization. Externalizing presentations \((b = 0.96, p < .001, \ldots)\).
SE=.18, 95% CI [0.61, 1.30]), but not internalizing presentations, were positively associated with using a higher number of services.

**Within racial and ethnic group.** A pathway between trauma exposure and externalizing symptoms was found for NH White ($b = 0.03, p < .001, SE=.01; 95\% CI [0.01, 0.04]$) and Black ($b = 0.04, p < .01, SE=.01, 95\% CI [0.01, 0.06]$) adolescents only. The paths from trauma exposure to intrusion ($b = 0.01, p < .01, SE=.01, 95\% CI [0.004, 0.02]$) and avoidance symptoms ($b = .02, p < .01, SE = .01, 95\% CI [0.01, 0.03]$) were statistically significant for Hispanic adolescents only. Significant parameter estimates for the path between trauma exposure and service utilization, covariates (age, gender, insurance), and a graphic representation of paths for each examination of Model 2 (overall, within racial-ethnic group) can be found in Figure 4.3.

To summarize, in Model 1, we examined if broadly, PTSD symptoms and emotional and behavioral concerns, informed the association between trauma exposure and service utilization before we proceeded to examine by symptom cluster and presentation within each racial-ethnic group. We found PTSD symptoms were associated with increased service utilization for Hispanic adolescents only, while emotional and behavioral concerns were associated with service utilization for all racial-ethnic groups except Black adolescents. In Model 2, we examined if specific symptom clusters (intrusion, avoidance, arousal) and presentations (internalizing, externalizing) were associated with services used. Externalizing symptom presentations were associated with increased service utilization for the overall group and NH White and Hispanic adolescents. Hyperarousal symptoms were the only PTSD symptom cluster associated with service utilization, specifically for Hispanic adolescents. Thus, it is necessary to examine within racial-ethnic group as patterns for the overall group patterns may not apply the same to each racial-ethnic group.
Discussion

The purpose of this study was to examine associations among trauma exposure, PTSD symptoms, emotional/behavioral problems, and service utilization across and within racial-ethnic group. Data gleaned from this study confirm the importance of understanding with more granularity the role of PTSD symptoms and emotional and behavioral concerns on the association between trauma exposure and service utilization. Our findings also support the notion that conducting overall group analyses may obscure important differences within the racial-ethnic group that can impede the provision of tailored care. Herein, we discuss the four key findings from this study (a) trauma exposure was associated with service utilization across all groups, (b) Hispanic adolescents had both hyperarousal and externalizing symptoms as associated with service utilization, (c) NH White adolescents had only externalizing symptoms as associated with service utilization, and (d) for NH Black adolescents, no symptoms were associated with service utilization.

Trauma exposure was associated with services used for adolescents presenting with self-harm types. This aligns with findings from previous studies, where youth who have been exposed to trauma may be more likely to access services (Briggs et al., 2013; Choi et al., 2017). This association was previously found in an international sample of adolescents who self-harm, our current study extends this finding to a sub-sample of adolescents with self-harm types in the United States. One previous study found maltreatment exposure did not predict service utilization for a sample of youth in the child welfare system when examining by racial-ethnic group (Martinez et al., 2013). This current study found that the association from trauma exposure to service utilization was significant within each racial-ethnic group, which may be explained by the fact that our study includes assessment for 20 different types of traumatic exposures. The exposures included in this study may be more inclusive of traumatic exposures racial-ethnic
minority adolescents experience, such as community violence. We recommend the screening of trauma exposure among adolescents who present with self-harm, as referral to services may be otherwise obscured. However, our study did not examine service utilization by what type of services were offered for the specific symptom presentations. Future studies may examine if trauma exposure relates to more targeted service sectors for adolescents who self-harm. For example, understanding if trauma exposure is associated with the use of specialty mental health care services, social services, or general health care services, and whether these associations vary by racial-ethnic group, such that Hispanic and Black adolescents may be more likely to be seen in non-targeted services, such as the juvenile justice system when presenting with self-harm.

For Hispanic adolescents, both hyperarousal and externalizing symptoms, were associated with service utilization. We found partial support for our hypotheses for the Hispanic sub-group, aligning with previous studies finding externalizing symptoms related to increased service utilization in Hispanic adolescents. Externalizing symptoms associating with service utilization among adolescents who self-harm makes sense in the context of previous studies reporting symptoms like aggression and observing self-injury scars (Hausmann-Stabile et al., 2018) as factors related to help-seeking. Probable PTSD and hyperarousal symptoms were also significantly associated with service utilization, which has not been previously noted for Hispanic adolescents or adolescents who self-harm. This finding suggests assessing clinicians and/or family members may evaluate these symptoms as a high priority to address among Hispanic adolescents who self-harm. This also corresponds with Andersen’s model’s proposition that need factors help explain service utilization, and extends the finding to a specific need factor, PTSD symptoms, and among an understudied population, Hispanic adolescents who report self-harm types. The findings are further supported by previous studies reporting that
adolescents with PTSD had a higher need for services and reported increased suicidality symptoms (Allwood et al., 2008). The current study extends our understanding by identifying PTSD as an important marker of service utilization for Hispanic adolescents. For future research, consideration should also be given to service utilization differences within-group in future studies. For example, a previous study examining trauma exposure and service utilization among Hispanic adolescents found that although trauma exposure rates were similar within group, service utilization rates were higher for U.S. born adolescents, compared to foreign born Hispanic adolescents (Bridges et al., 2010). Thus, future studies may choose to extend the work of this current study by examining relevant within-group factors, such as acculturation stressors, in understanding under what circumstances Hispanic adolescents access services.

Among NH White adolescents, only externalizing symptoms were associated with service utilization. We found partial support for our hypotheses for NH White adolescents. Aligning with previous literature, NH White adolescents’ service utilization was associated with emotional and behavioral problems overall, specifically externalizing symptoms (Malhorta et al., 2015; Martinez et al., 2013). Surprisingly, we did not find that internalizing symptoms, probable PTSD, or PTSD symptoms were associated with an increase in service utilization. Previous studies identified that internalizing symptoms were predictors of service utilization for NH White adolescents (Gudiño et al., 2009; Martinez et al. 2013). It is likely that self-harm types themselves present additional barriers to use of formal services (Michelmore & Hindley, 2012), such as a preference among young people to seek help via peers and other informal avenues, that need to be taken into consideration when developing strategies to promote service access and use.
For Black adolescents, we found no mental health need factors were associated with service utilization. An alarming finding in the context of a high-risk sample, who is both trauma-exposed and presenting with self-harm types. This is contradictory to previous studies that found that the externalizing symptoms corresponded with increased service utilization for African American youth (Gudiño et al., 2009; Martinez et al., 2013). Another study conducted among adolescents displaying negative externalizing behaviors found that African American adolescents, compared to NH White adolescents were less likely to use outpatient mental health services (Malhorta et al., 2015). However, these previous studies specifically focused on mental health service utilization. Our findings may be due to our broad service utilization definition, which includes multiple service sectors (e.g., school-based, social services). Additionally none of the PTSD symptoms were associated with service utilization for Black adolescents. Potentially, symptom clusters, such as hyperarousal, may serve protective functions (e.g., increased vigilance led to reduction in violence exposure; Phan et al., 2020), and thus the behaviors may be normalized in their environment and not seen as necessitating mental health treatment. While our study adds to our current understanding of relevant clinical factors for service access among Black adolescents who self-harm in a broader scope, future studies should also examine for more specific service utilization outcomes and include system- and family-level contextual factors, such as waitlists for mental health services and family perception of need. Though symptom need is an important factor to consider in accessing services, it may be especially necessary to assess contextual factors in Andersen’s model that may be of more relevance when examining how to improve service access and use. Thus, an understanding of the environmental and socio-cultural context in which the adolescent is receiving care is needed and may be especially
important to consider for Black adolescents who do not have service utilization associated with individual need-level factors.

Overall, our study demonstrates that adolescents with self-harm types may have a high level of unmet mental health need factors, and that levels of unmet need factors are highest among NH Black adolescents. This highlights the importance of examining within racial-ethnic group, as patterns for the overall group may not apply the same to each racial-ethnic group. Moreover, symptom clusters and presentations, may be used to signal for NH White and Hispanic adolescents who self-harm, the need to address externalizing symptoms. Other symptom presentations not assessed here may be more relevant for identifying Black adolescents with self-harm types and in addition, there may be clinician biases in the assessment of mental health need for Black adolescents that we could not account for in the current study.

**Strengths and Limitations**

Several limitations exist in our variable creation. We did not account for the spectrum of severity for (a) psychiatric symptoms (i.e., dichotomous measure) and (b) trauma exposure types. We also used a sample of adolescents who reported a type of self-harm, such as suicidality and non-suicidal self-injury, without examining outcomes for each type of self-harm. Thus, it is difficult to understand if the type of self-harm and severity of trauma exposures types and related symptomology contributed to the disparities noted by race and ethnicity.

Several limitation exist with regard to the study sample and data analyses. First, the cross-sectional design of the study limits analysis to associations versus exploring temporal relationships and causation. Second, we did not statistically test whether the paths different significantly between race/ethnicity groups and no power analyses were conducted to examine if we were powered to examine within race/ethnicity group. Also, the absence of an association between probable PTSD, PTSD symptoms, and service utilization may be due to the nature of
our study sample. The youth in our sample received a referral for trauma-specific treatment due to having PTSD symptoms. Thus, our findings are not generalizable to the broader population of adolescents receiving mental health treatment nor those in community settings populations. However, clinician biases in evaluating mental health need differentially for adolescents from racial-ethnic minority groups may have also contributed to the lack of symptom presentation associations to service utilization. Data were also collected between 2004-2010, which precedes important policy changes that may differentially impact health care service utilization, such as the Affordable Care Act.

Please note that the analytic strategies and results for the publication version of these findings will be slightly different from those noted in the Method and Results sections. Specifically, we will adhere to the NCTSN protocol of selecting children and adolescents with at least one identified trauma type to reduce the likelihood of misinterpreting missing data as equal to zero trauma exposures. Preliminary analyses using this method suggests that the overall direction of the findings are the same but some of the sample sizes and parameter estimates differ slightly.

Despite the limitations, our study included several strengths. The dataset includes a nationally-representative, treatment-seeking sample from across the U.S., that reports on self-harm types. The dataset also includes comprehensive assessment of trauma exposure history and psychiatric symptom data through a thorough clinician evaluation for each adolescent. Additionally, the dataset included parent-report data for symptom presentation. For example, we were able to study a previously unexamined factor in relation to service utilization for adolescents who self-harm, PTSD symptoms. Further, we had sufficient sample size to examine
these findings within racial-ethnic group, which improves the applicability of these findings specifically to NH White, NH Black and Hispanic adolescents.

**Conclusion**

Cumulative trauma exposure is associated with receipt of services among adolescents who self-harm, but the degree of association varies across racial-ethnic groups. Further, trauma exposure contributes to the development of adverse mental health outcomes among those who self-harm, such as posttraumatic stress symptoms, internalizing and externalizing symptom presentations, but these presentations themselves are not necessarily associated with service utilization. The relevance of which emotional/behavioral problems and PTSD symptoms are associated with service utilization varied for the overall and within racial-ethnic group analyses. Among NH White and Hispanic adolescents, externalizing symptoms related to service utilization. Among Hispanic adolescents, probable PTSD and arousal symptoms increased the receipt of services. For Black adolescents, no symptoms were associated with service utilization. As shown by our findings, examining by overall group without distinction to race-ethnicity may be missing key differences in the pathways to service utilization for adolescents who self-harm. Future studies should conduct within-group analyses to illuminate how model pathways fit within each group. We recommend identification and referral efforts for adolescents who self-harm, with requirement of thorough assessment of trauma history and related symptoms in addition to assessment of self-harm types to improve receipt of targeted and effective mental health services.
Figure 4.1. Null models

Note. Top Row, left to right: Results for Overall group, NH White; Bottom Row, left to right: NH Black, Hispanic; PTSD B: intrusion/reexperiencing; PTSD C: avoidance/numbing; PTSD D: hyperarousal; *p < 0.05, **p < 0.01, ***p < 0.001

Figure 4.2. Model 1: Total Scale Scores (Probable PTSD and Emotional/Behavioral problems)

Note. Top Row, left to right: Results for Overall group, NH White; Bottom Row, left to right: NH Black, Hispanic; PTSD B: intrusion/reexperiencing; PTSD C: avoidance/numbing; PTSD D: hyperarousal; *p < 0.05, **p < 0.01, ***p < 0.001
Figure 4.3. Model 2: PTSD Symptom Clusters, Internalizing, and Externalizing symptoms

Note. Top Row, left to right: Results for Overall group, NH White; Bottom Row, left to right: NH Black, Hispanic; PTSD B: intrusion/reexperiencing; PTSD C: avoidance/numbing; PTSD D: hyperarousal
*p < 0.05, **p < 0.01, ***p < 0.001
Table 4.1. Service Utilization Characteristics

<table>
<thead>
<tr>
<th>Total Service utilization</th>
<th>Service Types Included</th>
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<tr>
<td>Total Number of Services (0-19)</td>
<td>Inpatient psychiatric unit, Residential treatment center, Detention center, training school, jail, prison, Group home, Treatment foster care, Probation officer, court counselor, Day treatment program, Case management, care coordination, In-home counseling, Outpatient therapy, Outpatient psychiatrist treatment, Primary care for trauma-related symptoms, School counselor, psychologist, social worker, Special class or special school, Child welfare, Dept. of social services, Foster Care, Therapeutic recreation service or mentor, Hospital emergency room, Self-help group</td>
</tr>
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Table 4.2. Descriptive for Adolescents with Self-harm Types

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Overall (n=1578)a</th>
<th>White (n=659)a</th>
<th>Black (n=294)a</th>
<th>Hispanic (n=625)a</th>
<th>Between-group comparisonsb (β values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>15.1 (SD=1.6)</td>
<td>15.3 (SD=1.6)</td>
<td>14.8 (SD=1.5)</td>
<td>15.0 (SD=1.6)</td>
<td>.26</td>
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<tr>
<td>Sex: Female</td>
<td>1,086; 68.8%</td>
<td>468; 71.0%</td>
<td>198; 67.4%</td>
<td>420; 67.2%</td>
<td>-.001</td>
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<td>Trauma</td>
<td>1374; 87.1%</td>
<td>627; 95.1%</td>
<td>286; 97.3%</td>
<td>461; 73.8%</td>
<td>-.24</td>
</tr>
<tr>
<td>PTSD Total</td>
<td>533; 45.0%</td>
<td>227; 46.1%</td>
<td>99; 49.8%</td>
<td>207; 41.9%</td>
<td>-.50</td>
</tr>
<tr>
<td>PTSD B</td>
<td>1,028; 86.8%</td>
<td>421; 85.6%</td>
<td>170; 85.4%</td>
<td>437; 88.5%</td>
<td>.03</td>
</tr>
<tr>
<td>PTSD C</td>
<td>877; 74.0%</td>
<td>377; 76.6%</td>
<td>143; 71.9%</td>
<td>357; 72.2%</td>
<td>.004</td>
</tr>
<tr>
<td>PTSD D</td>
<td>1,038; 87.6%</td>
<td>438; 89.9%</td>
<td>172; 86.4%</td>
<td>428; 86.6%</td>
<td>-.002</td>
</tr>
<tr>
<td>CBCL Total</td>
<td>801; 72.0%</td>
<td>359; 76.9%</td>
<td>126; 63%</td>
<td>316; 71.0%</td>
<td>.03</td>
</tr>
<tr>
<td>CBCL Int</td>
<td>750; 67.5%</td>
<td>330; 71%</td>
<td>108; 54.0%</td>
<td>312; 70.1%</td>
<td>.16</td>
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<tr>
<td>CBCL Ext</td>
<td>667; 60%</td>
<td>304; 65.1%</td>
<td>110; 55.0%</td>
<td>253; 56.9%</td>
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<tr>
<td>Service utilization</td>
<td>3.2 (SD=2.8)</td>
<td>3.9 (SD=2.9)</td>
<td>2.8 (SD=2.7)</td>
<td>2.7; (SD=2.6)</td>
<td>-.13</td>
</tr>
</tbody>
</table>

Note. NHW: Non-Hispanic White; Int: Internalizing symptoms; Ext: Externalizing Symptoms; PTSD B: intrusion/reexperiencing; PTSD C: avoidance/numbing; PTSD D: hyperarousal

a Sample sizes differ on each variable due to listwise deletion.
b To control for family-wise errors, a Bonferroni correction was included (Bolded values indicate significance was reaching at p=.001).
Table 4.3. Correlations Among Variables of Interest for Adolescent with Self-Harm

<table>
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<th>5</th>
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<th>7</th>
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<th>9</th>
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<tbody>
<tr>
<td>1. Total Services Used</td>
<td>.30**</td>
<td>.10*</td>
<td>.05</td>
<td>.09*</td>
<td>.08*</td>
<td>.12**</td>
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<td>.20*</td>
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<td>2. Trauma Exposure</td>
<td>--</td>
<td>.13**</td>
<td>.10**</td>
<td>.10</td>
<td>.07*</td>
<td>.13**</td>
<td>.07*</td>
<td>.15*</td>
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<td>3. PTSD Total</td>
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<td>.35**</td>
<td>.51**</td>
<td>.34**</td>
<td>.12**</td>
<td>.15**</td>
<td>.06**</td>
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<tr>
<td>4. PTSD B</td>
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<td>.46**</td>
<td>.41**</td>
<td>.12**</td>
<td>.15**</td>
<td>.06</td>
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<td>5. PTSD C</td>
<td>--</td>
<td>.48**</td>
<td>.11**</td>
<td>.15**</td>
<td>.06</td>
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<td>6. PTSD D</td>
<td>--</td>
<td>.15**</td>
<td>.14**</td>
<td>.11**</td>
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<td></td>
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<td>7. CBCL Total</td>
<td>--</td>
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Note. Int: Internalizing symptoms; Ext: Externalizing Symptoms; PTSD B: intrusion/reexperiencing; PTSD C: avoidance/numbing; PTSD D: hyperarousal; N=1578

*p < 0.05, **p < 0.01, ***p < 0.001
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CHAPTER 5: DISCUSSION & CONCLUSION

In recent years, adolescents from racial and ethnic minority groups have experienced disproportionately high rates of suicide attempts and related deaths (CDC, 2021; Ivey-Stephenson, 2020; Khan et al., 2018, Price & Khubchandani, 2017). For example, suicide attempt rates among Black and Hispanic adolescents were significantly higher than those of NH White adolescents (NH White: 7.9%; Hispanic: 8.9%; NH Black: 11.8%) in the past 12 months (Ivey-Stephenson, 2020). Rates among specific groups have also increased, especially for Black adolescents (Sheftall et al., 2021). Considering increasing rates of suicide attempts among adolescents from racial and ethnic minority groups, it is imperative to improve strategies for their identification and referral to promote service utilization and receipt of mental health treatment. To this end, the purpose of this dissertation was to describe service utilization outcomes and identify factors related to service utilization among adolescents from racial and ethnic minority groups, specifically Hispanic and NH Black adolescents, who report self-harm types. The three aims of this dissertation were built upon each other. The first aim was to conduct a scoping review to identify and describe service utilization outcomes and factors related to these outcomes for adolescents from racial and ethnic minority groups (Chapter 2). The second aim was to examine the role of self-harm types and race/ethnicity on service utilization outcomes for adolescents utilizing the National Child Traumatic Stress Network’s Core Data Set (Chapter 3). Using the same dataset, the third and final aim was to test associations between trauma exposure, trauma-related symptoms, and services used across and within racial and ethnic groups for a subsample of adolescents who report self-harm types (Chapter 4). Herein, I will synthesize the
results for each chapter, examine strengths and limitations, and provide research and clinical implications from this dissertation study.

**Chapter 2: “Service Utilization Characteristics and Correlates for Self-Harm Types Among Adolescents from Racial and Ethnic Minority Groups: A Scoping Review” (Aim 1)**

Chapter 2 addressed Aim 1, which was to assess service utilization characteristics and identify factors associated with utilization among adolescents from racial and ethnic minority groups who report self-harm types. Scoping review methodology (Tricco et al., 2018) guided our procedures, which included (a) a systematic literature search (PubMed, PsychInfo, CINHAL, Scopus, Web of Science); (b) eligibility screening; (c) extraction of service utilization related outcomes and associated factors; (d) reconciliation with second reviewer; (e) synthesis of the extracted results. This review was guided by Andersen’s Behavioral Model of Health Service utilization to identify and extract the predisposing, enabling, and need factors for service utilization (Andersen, 1995).

For this review, the three main findings were (a) suicide attempt symptom presentations and intensive, crisis-oriented care were the most frequently reported among all adolescents from racial and ethnic minority groups, (b) family member adaptability and awareness of self-harm types may facilitate service utilization (c) externalizing symptom presentations most commonly accompanied receipt of services. Together, these findings suggest adolescents from racial and ethnic minority groups who present with self-harm symptoms are not identified and referred to services until presentations are observable and/or severe (e.g. externalizing symptoms, suicide attempts), thus requiring a higher level of care. However, family member characteristics, such as adaptability and awareness of the adolescent's self-harm may facilitate service utilization. These findings should be interpreted with caution given the small sample of studies identified (n=12) and cannot be generalized to adolescents from racial and ethnic minority groups overall.
We found the studies included in this review focused on individual-level and family-level factors, and largely neglected structural-level and cultural factors in relation to service utilization. While insurance status was examined in some of the studies included, the samples of youth were mostly insured, which does not provide sufficient variability to assess the role of insurance in service utilization in this review. This dissertation chapter took a step in identifying factors examined in relation to the receipt of services, and which factors may be significant in facilitating service utilization. Further, this dissertation chapter also highlights the significant gaps in our current knowledge of service utilization for adolescents from racial and ethnic minority groups who self-harm.

Chapter 3: “Racial, Ethnic and Gender Disparities in Services Used Among Adolescents with Elevated Risk for Self-Harm” (Aim 2)

The goal of this chapter was to examine the role of having self-harm type present on service utilization characteristics (number of services, intensity, service sectors accessed), and whether the role of self-harm differs by race/ethnicity and gender. This study utilized data from the National Child Traumatic Stress Network (NCTSN) Core Data Set. The sample consisted of trauma-exposed, treatment-seeking adolescents (12-17) who had available data for self-harm, service utilization, race/ethnicity, and covariates (N=4,980). The design for this study was a cross-sectional, secondary data analysis of baseline clinical assessment data. Currently, most research has focused on examining service utilization within general healthcare and mental healthcare sectors for adolescents who have self-harm types. By focusing on additional service utilization sectors and examining the effects of self-harm by race/ethnicity and gender, there is potential to uncover where services are accessed and who is most likely to access specific service systems. This descriptive information can inform what future studies should focus efforts to
understand service access and pathways to mental healthcare from the systems most likely to be accessed by adolescents at risk for suicide.

Results from this study demonstrated Black adolescents have lower levels of mental health service utilization, compared to NH White and Hispanic youths. Further, Black youths who had histories of self-harm were not more likely to receive mental health services than other Black youths. These results further confirmed the documented disparities in mental health service utilization for Black adolescents (Nestor et al., 2016; Wu et al., 2010) compared to NH White adolescents. Additionally, these results demonstrate that within Black adolescents who have varying degrees of mental health needs, self-harm types did not associate with increased mental health service utilization. Additional findings include that medical healthcare services were more likely to be accessed and that school-based services may be a more accessible option for care across adolescent groups.

These findings are indicative of the persistent disparities in access to care for self-harm types, especially among Black adolescents. Though this study’s data were collected from 2004-2010, these mental health service utilization outcomes are alarming in the context of growing suicide attempt rates among Black adolescents in the US (Ivey-Stephenson et al., 2020). Our findings indicate the need to examine under what circumstances is access to care for adolescents from racial and ethnic minority groups, especially Black adolescents happening, if at all. Additionally, although not explored in this study, once care is accessed mental health treatment that is culturally tailored for treatment of self-harm types amongst adolescents from racial and ethnic minority groups is also key for continued engagement in services.

This chapter was an innovative step in describing service utilization characteristics for adolescents with self-harm types. However, the study is not without limitations, such as how
self-harm types were defined more broadly, thus findings cannot be applied to specific types of self-harm types and severity levels. Further, we were unable to assess service utilization for Asian American, Pacific Islander, and Native American. This limitation was also present in Chapter 2, demonstrated by the lack of studies documenting service utilization for Asian American adolescents who present with self-harm.

**Chapter 4: “Trauma-Related Factors Associated with Service Utilization for Adolescents Reporting Self-Harm (Aim 3)**

In Chapter 4, we tested pathways between trauma exposure, posttraumatic stress symptoms, and service utilization, across and within racial and ethnic groups (i.e., NH White, Black, Hispanic). Utilizing the NCSTN Core Data Set, we examined these paths among a sample of trauma-exposed, treatment-seeking adolescents who reported self-harm types \((N=1578)\) and had available data for services used. The design for this study was a cross-sectional secondary data analysis, utilizing structural equation methodology (i.e., path analysis). An adapted version of Andersen’s behavioral model of health service utilization was used to test the paths between trauma-related factors (predisposing, enabling, need) and services used. We took an innovative step forward by focusing on a previously unexamined factor in service utilization for adolescents who self-harm, trauma exposure and related symptoms. Trauma exposure and related symptoms are well-documented concerns among adolescents who self-harm (Ford & Gomez 2015), and have their identification has the potential to increase the receipt of services.

While the path from trauma exposure to service utilization was significant among the overall group and within each racial and ethnic group, significant disparities persisted for Black adolescents. No mental health need factors were associated with service utilization among Black adolescents. Previous studies found the presence of elevated externalizing symptoms increased mental health service utilization for Black adolescents (Gudiño et al., 2009; Martinez et al.,
Hispanic adolescents and NH White adolescent groups both had externalizing symptoms associate with service utilization. Hispanic adolescents only had PTSD and more specifically, hyperarousal symptoms, associate with service utilization.

Our study highlights the importance of (a) assessing factors associated with service utilization within racial and ethnic group, (b) trauma exposure assessment, (c) examining by specific PTSD symptoms and presentations. The granularity in this study helped illustrate whether it was level of overall level of symptom need or specific symptoms that corresponded to adolescents receiving more services and whether these findings could be applied to each racial and ethnic group, which can help in the identification of adolescents at high risk to attempt suicide. Additionally, this study aligns with previous studies suggesting systemic disparities in referral processes exist for Black adolescents despite documented mental health need (Alegria et al., 2012). Futures studies should examine the role of clinician biases in assessing symptoms for Black adolescents at risk for suicide.

**Potential Intervention Targets to Reduce Racial and Ethnic Service Utilization Disparities**

Racial and ethnic disparities in service utilization were found in each chapter of this dissertation for adolescents with self-harm types. The studies found in chapter 2 and our findings in chapter 3 of this dissertation confirm NH White adolescents who present with self-harm are more likely to receive services compared to NH Black and Hispanic adolescents. However, this finding may differ by service utilization outcome as was found in chapter 3, such that mental health services were more likely to be accessed by NH White adolescents, but service sectors such as healthcare services and school-based services were identified as potentially more equitable service systems in terms of access. Thus, future research should further examine pathways to accessing service systems to identify what the barriers and facilitators are to accessing each of these service systems. This information will further inform strategies to
improve access to targeted mental health services for adolescents who self-harm. Additionally, future research should examine the current policies and practices in place for suicide prevention within service systems adolescents from racial and ethnic minority groups are more likely to access.

Beyond examining between racial and ethnic group differences in service utilization, we focused on within-group service utilization outcomes and factors related to these outcomes in each chapter. Our findings align with the within-group analyses in chapter 4, which demonstrated that externalizing symptoms accompanied self-harm presentations when services were accessed, except for Black adolescents in our sample. This may be indicative of additional barriers faced by Black adolescents in accessing services that were not addressed in this study. The role of PTSD symptoms was also explored and was found to be associated with service utilization for Hispanic adolescents only. This finding may be indicative of an increased perception of PTSD symptoms as urgent among Hispanic adolescents, a finding that should be further explored to understand how PTSD symptoms present among adolescents who self-harm within racial and ethnic group to further understand how self-harm may present differently within racial and ethnic group.

While symptom presentations varied in their association with service utilization within each racial and ethnic group, cumulative trauma exposure alone was strongly associated across and within racial and ethnic groups. Thus, a potential intervention may be to increase the assessment of trauma exposures and related symptoms, to improve the identification and referral of adolescents at risk for suicide to mental health services. However, this recommendation must be taken in consideration of the broader context of a currently taxed mental healthcare system, with long waitlists and a shortage of providers who may be able to provide culturally tailored
care once an adolescent is identified. Thus, the identification of adolescents who have trauma exposure history and/or unmet mental health is necessary but should be implemented with caution if intervention cannot be provided after assessment.

**Implications for Nursing Practice**

In the recent *Future of Nursing 2020-2030: Charting the Path to Achieve Health Equity* report, one of the major recommendations from this report was to prepare nurses to address challenges regarding access to care for mental health problems (Wakefield et al., 2021). Further, the report emphasizes the need for nurses to implement upstream strategies to identify and treat individuals with disproportionate health burden. The findings from this dissertation can help inform strategies to address these goals and improve access to mental healthcare. For example, this study identified that trauma exposure was associated with an increase in service utilization across all adolescents. Thus, creating a shared national agenda on trauma-informed suicide prevention across sectors where nurses are present could inform policies to achieve equity for suicide prevention. Additionally, this dissertation study found significant service access disparities for adolescents from racial and ethnic minority groups, especially Black adolescents. To help address these disparities in service access, state and federal policies should promote full scope of practice for nurses, who more often practice in rural areas where racial and ethnic minority adolescents may be especially likely to be underserved. This can help improve the number of available providers for adolescents from racial and ethnic minority groups who live in rural areas. State and federal budgets should also account for funding school nurses to meet student to nurse ratios recommendations (750:1), which is currently met by less than half of states (Mann et al., 2019). School nurses can also receive additional training to help address unmet mental health needs for adolescents in school-based settings.
**Strengths & Limitations**

A strength of the overall dissertation study is that findings were guided by Andersen’s behavioral model, contributing to an existing framework of identified factors related to service utilization for adolescents with self-harm types. An additional strength was the inclusion of within-group examination when possible in each chapter, to move beyond comparing outcomes to NH White adolescents, and examining relevant factors to service utilization with more specificity to racial and ethnic group. For the data-based chapters (3 and 4), the sample used a diverse, treatment-seeking sample who had data present for self-harm, an under-identified mental health concern. An additional strength of the dataset utilized is that there were multiple informants for the clinical data, including clinician assessment, parent/caregiver-reported measures, and adolescent-report as well.

Limitations for this dissertation include that service utilization outcomes could not be examined for Asian American/Pacific Islander (AAPI) and Native American adolescents in chapters 3 and 4 due to sample size limitations. In addition, this dissertation study utilized a clinical sample of treatment-seeking adolescents who may have had a higher level of mental health needs, specifically trauma-related mental health needs, which cannot be generalized to the general population of adolescents seeking treatment. Thus, the analyses in this study should be replicated among other adolescent samples, such as community-dwelling samples. Lastly, we were not able to fully test the factors outlined in Andersen’s model in relation to service utilization, such as, structural-level (e.g., living conditions, community resources) and culture-specific factors (e.g., acculturation, immigration stressors).
Conclusion

In all, this dissertation was able to synthesize service utilization outcomes and factors associated with service utilization for adolescents from racial and ethnic minority groups who self-harm, explored the role of trauma-related factors associated with service utilization within racial and ethnic group, and provides recommendation for future research in this area. Two key takeaways are (a) Black adolescents with self-harm types may experience additional barriers to service utilization and (b) increased trauma exposure is associated with service utilization for across and within racial and ethnic groups. Future research should examine not only individual- and family-level factors, but also include structural-level and culture-specific factors that contribute to differential service utilization to improve strategies for facilitating service access and receipt.
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APPENDIX A: CHAPTER 2 SEARCH STRATEGY

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5. Web of science
((("ethnic disparities" OR "ethnic disparity" OR "health disparities" OR "health disparity" OR "healthcare disparities" OR "health care disparities" OR "healthcare disparities" OR "health-care disparities" OR "health care disparity" OR "healthcare disparity" OR "health-care disparity" OR "health status disparities" OR ("disparities in health") OR ("J Health Care Poor Underserved[Journal]" OR "J Health Dispar Res Pract[Journal]" OR "J Racial Ethn Health Disparities[Journal]")) OR "health inequality" OR "health inequalities" OR "health inequities" OR "health inequity" OR "African American" OR "African Americans" OR "African ancestry" OR "african continental ancestry group" OR ageism OR AIAN OR "Alaska Native" OR "Alaska Natives" OR "american native continental ancestry group" OR apartheid OR Asian OR "asian continental ancestry group" OR Asians OR "Black American" OR "Black Americans" OR "ethnic group" OR "ethnic groups" OR "Black ancestry group" OR "Black ancestry groups" OR "Black populations" OR "Black population" OR "Black populations" OR "Black population") OR "ethnic inequalities" OR "ethnic group" OR "ethnic populations" OR "ethnic population" OR "ethnic populations") OR "Native American" OR "Native Americans" OR "Native Hawaiian" OR "Native Hawaiians" OR "Pacific Islander" OR "Pacific Islanders" OR "people of color")

AND (Pediatrics OR pediatric OR Pediatrics OR paediatric OR paediatrics OR juvenile OR juvenile OR juvenile OR child OR child OR children OR childhood OR preadolescent OR preadolescents OR prepubescent OR Adolescent OR Adolescent OR adolescents OR adolescence OR youth OR young OR teenagers OR teenaged OR teenage OR teen OR teens) AND ("suicide", attempted" OR "Suicidal Ideation" OR Suicide OR suicidal OR suicides OR "nonsuicidal self injury" OR "self-inflicted injury" OR "self-harm" OR "nonsuicidal self harm" OR "suicidal behaviors" OR suicidal) AND ("juvenile justice" OR "detention center" OR Jail OR prison OR church OR "spiritual care" OR "spiritual service" OR "religio* service" OR "RELIGIO* care" OR "training school[ Title" OR "probation[ Title" OR "court[ Title" OR "foster care[ Title" OR "group care[ Title" OR "group home[ Title" OR "residential treatment[ Title" OR "child welfare[ Title" OR "social services[ Title" OR self-help OR "case management[ Title" OR "care coordination[ Title" OR "school health[ Title" OR "community health [ Title" OR "school[ Title" AND "health[ Title") OR "mental health services [ Title" OR "Attitude to Health" OR "treatment engagement" OR dropout OR dropouts OR "treatment participation" OR compliance OR adherence OR noncompliance OR nonadherence OR engagement OR "Patient Acceptance of Health Care" OR "Health Services Accessibility" OR "Healthcare Disparities" OR "Help-Seeking Behavior" OR ((health OR healthcare) AND ("community-based") OR barrier OR barriers OR access OR accessibility OR accessible OR availability OR available OR disparity OR disparities OR utiliz* OR utilis* OR acceptance OR acceptor OR acceptors OR non acceptor OR nonacceptors OR acceptability OR coverage) OR (help AND seek*)))
### APPENDIX B: FULL LIST OF VARIABLES REQUESTED FROM NCTSN CDS

#### Full List of Variables Requested from NCTSN CDS

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<thead>
<tr>
<th>Construct/Measure</th>
<th>Variable</th>
<th>Variable Name</th>
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<tr>
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<td>Race</td>
<td>NEWRACE&lt;NRACE&gt;</td>
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<td>Gender</td>
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<td>Public insurance</td>
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<td>Primary Language spoken at home</td>
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<td>Country child was born</td>
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<tr>
<th>Indicators of Severity</th>
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<td></td>
<td>Other self-injurious behaviors</td>
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| Service Usage          | Inpatient psychiatric unit | BOSINPSY<CTYNUN> |
|                       | Residential treatment center | BOSRES<CTYNUN> |
|                       | Detention center, training school, jail, prison | BOSDET<CTYNUN> |
|                       | Group home | BOSGROUP<CTYNUN> |
|                       | Treatment foster care | BOSTXfos<CTYNUN> |
|                       | Probation officer, court counselor | BOSPROB<CTYNUN> |
|                       | Day treatment program | BOSDAYTR<CTYNUN> |
|                       | Case management, care coordination | BOSCASMG<CTYNUN> |
|                       | In-home counseling | BOSINHME<CTYNUN> |
|                       | Outpatient therapy | BOSOUTTX<CTYNUN> |
|                       | Outpatient psychiatrist treatment | BOSOUTPS<CTYNUN> |
|                       | Primary care for trauma-related symptoms | BOSPRIMC<CTYNUN> |
|                       | School counselor, psychologist, social worker | BOSschcn<CTYNUN> |
|                       | Special class or special school | BOSspcl<CTYNUN> |
|                       | Child welfare, Dept. of social services | BOSCHWEL<CTYNUN> |
|                       | Foster Care | BOSFOST<CTYNUN> |
|                       | Therapeutic recreation service or mentor | BOSREC<CTYNUN> |
|                       | Hospital ER | BOSER<CTYNUN> |
|                       | Self-help group | BOSSELFH<CTYNUN> |

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<td>Traumatic/complicated grief</td>
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<td>Dissociation</td>
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<td>BCEPTSD</td>
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<td>Depression</td>
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<td>Attachment problems</td>
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<td>Externalizing Behavior Raw Score—Num</td>
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<td>Externalizing Behavior Clinical Significance</td>
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<td>Externalizing Behavior T Score—Num</td>
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<td>Internalizing Behavior Percent—Num</td>
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<td>Internalizing Behavior Clinical Significance</td>
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<td>Briere: Anger T Score — Num</td>
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<td>Briere: Anxiety T Score — Num</td>
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<td>Briere: Dissociation — Num</td>
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<td>Briere: Post Traumatic Stress — Num</td>
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<td>Briere: Post Traumatic Stress T Score — Num</td>
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| Dataset= TRAUMA                    |
| InForm Table=General Trauma Form and Trauma Detail Form |

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<td>Sexual maltreatment/abuse</td>
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<td>Sexual assault/rape</td>
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<td>Physical maltreatment/abuse</td>
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<td>Physical assault</td>
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<td>Serious injury/accident</td>
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<td>Kidnapping</td>
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<td>Traumatic loss or bereavement</td>
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<td>Impaired Caregiver</td>
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<td>Extreme Interpersonal Violence (other)</td>
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<td>Community violence (other)</td>
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<td>School violence (other)</td>
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<td>Other trauma (other)</td>
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APPENDIX C: CHAPTER 3 AND 4 SUPPLEMENTARY MATERIALS

Chapter 3 Supplementary Materials

Table S3.1 Self-Harm Differences: Between Group Differences

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<thead>
<tr>
<th></th>
<th>No Self-Harm (n=4,980)</th>
<th>Self-injury only (n=3,661)</th>
<th>Suicidality only (n=4,170)</th>
<th>Both (n=3,997)</th>
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<tr>
<td><strong>Model:</strong></td>
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<tr>
<td><strong>Coefficients</strong></td>
<td>F(2, 4,977)= 32.18***</td>
<td>F(2, 3,658)= 16.67***</td>
<td>F(2, 4, 167)= 1.40</td>
<td>F(2, 3,994)= 43.77***</td>
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<td>-.06***</td>
<td>-.02</td>
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<td>NH White/Hispanic</td>
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<td>-.03***</td>
<td>-.02</td>
<td>-.08***</td>
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<tr>
<td>Black/Hispanic</td>
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<td>.03**</td>
<td>.01</td>
<td>.06***</td>
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*p<0.05, **p<0.01, ***p<0.001

Table S3.2 Service Utilization Differences: Between Racial and Ethnic Group Differences

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<th>Intensity</th>
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<tr>
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<td>F(2, 4,977)=92.10***</td>
<td>F(2, 3,573)=8.95*</td>
<td>F(2, 4,961)=85.60**</td>
<td>F(2, 4,714)=32.17***</td>
<td>F(2, 4917)=13.08**</td>
<td>F(2, 4,9671)=14.65**</td>
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<tr>
<td><strong>Coefficients</strong></td>
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<tr>
<td><strong>NH White/NH Black</strong></td>
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<td>-.07**</td>
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<td>-.035**</td>
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*p<0.05, **p<0.01, ***p<0.001
Chapter 4 Supplementary Materials

Table S4.1 Correlations Among Variables of Interest with NH White Adolescent Self-Harm Group (n=659)

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Note. Int: Internalizing symptoms; Ext: Externalizing Symptoms
*p < 0.05, **p < 0.01, ***p < 0.001

Table S4.2 Correlations Among Variables of Interest with NH Black Adolescent Self-Harm Group (n=294)

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Note. Int: Internalizing symptoms; Ext: Externalizing Symptoms
*p < 0.05, **p < 0.01, ***p < 0.001
Table S4.3 Correlations Among Variables of Interest with Hispanic Adolescent Self-Harm Group (n=625)

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Note. Int: Internalizing symptoms; Ext: Externalizing Symptoms
*p < 0.05, **p < 0.01, ***p < 0.001

Table S4.4 Missing Values from Each Model Tested

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