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SUICIDALITY AMONG AT-RISK ADOLESCENTS RECEIVING COMMUNITY-BASED BEHAVIORAL AND MENTAL HEALTH SERVICES IN THE UNITED STATES

A Critical Examination Using Mixed Methods

Karen Lynn Celedonia

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University of Turku

Faculty of Medicine
Department of Clinical Medicine
Adolescent Psychiatry
Doctoral Programme in Clinical Research

Supervised by

Docent Michael Lowery Wilson
Department of Clinical Medicine
University of Turku
Finland

Associate Professor Max Karukivi
Department of Adolescent Psychiatry
University of Turku
Finland

Reviewed by

Professor Jouko Miettunen
Research Unit of Population Health
University of Oulu
Finland

Professor Sami Pirkola
Social Psychiatry
Tampere University
Finland

Opponent

Associate Professor Peter Larm
Department of Public Health Sciences
University of Stockholm
Sweden

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KAREN LYNN CELEDONIA: Suicidality Among At-Risk Adolescents Receiving Community-Based Behavioral and Mental Health Services in the United States: A Critical Examination Using Mixed Methods
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ABSTRACT

Though much research has been conducted on risk factors for adolescent suicidality, most of this research has been performed using population-based, school-based, or clinical samples from psychiatric hospitals. Little research has been done using community-based samples of adolescents receiving behavioral and mental health services (BMHS) in the community. This is a significant gap in the literature given that this sub-population of adolescents is at increased suicidality risk due to elevated exposure to adverse childhood experiences (ACEs).

This thesis adds to the research on adolescent suicidality among adolescents receiving BMHS at a community-based behavioral and mental health care organization in the United States. Using a mixed-methods approach, this thesis examines the process involved in conducting research in the community setting and investigates correlates of suicidality among adolescents receiving BMHS in the community, as well as analyzes temporal patterns of suicidal events following suicidality risk screening. Additionally, this thesis studies qualities that foster trust between adolescents receiving BMHS in the community and their treating clinicians, as therapeutic alliance is an important component to effective treatment.

The study found that sexual abuse was the only significant predictor of suicidality at the multi-variate level. Survival analysis revealed that adolescents who screened negative for suicidality risk at intake had a longer time to reported suicidal event than adolescents who screened positive for suicidality risk. The log rank test for significance between the two survival distributions was significant. Five overarching categories of trust building techniques emerged: 1) Ecosystemic Approach, 2) Strong Working Alliance, 3) Professionalism, 4) Warmth & Support, and 5) Open Communication. Taken as a whole, the results from this thesis can be used to guide suicidality screening and treatment approaches in the community.

KEYWORDS: adolescent suicidality, community-based samples, at-risk youth

TURUN YLIOPISTO
Lääketieteellinen tiedekunta
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Tammikuu 2025

TIIVISTELMÄ

Vaikka nuorten itsetuhoisuuden riskitekijöitä on tutkittu paljon, suurin osa tutkimuksista on tehty käyttäen normaaliväestöä edustavia aineistoja, koululaisaineistoja tai psykiatrisia potilasaineistoja. Tutkimusta on tehty vain vähän aineistoilla, jotka edustavat yhteisöpohjaisia mielenterveyspalveluita käyttäviä nuoria. Tämä on merkittävä puute kirjallisuudessa, koska kyseinen ryhmä on kliinisesti tärkeä ja heillä on kohonnut riski itsetuhoisuudelle liittyen heidän altistumiselleen haitallisille lapsuusiän kokemuksille.

Tämä väitöskirjatyö täydentää tutkimusta nuorten itsetuhoisuudesta aineistossa, joka edustaa mielenterveys- ja käyttäytymisterveyspalveluita yhteisöpohjaisessa organisaatiossa saavia nuoria Yhdysvalloissa. Tässä väitöskirjatyössä arvioidaan monimenetelmällistä lähestymistapaa käyttäen prosessia, jossa tutkimus toteutetaan yhteisöpohjaisia mielenterveyspalveluita saavien nuorten keskuudessa. Lisäksi väitöskirjatyössä analysoidaan ajallisia kehityskulkuja itsetuhoisuuden seulonnasta itsetuhoiseen tekoon. Koska terapeuttinen allianssi on tärkeä osa tehokasta hoitoa, väitöskirjatyössä selvitetään myös vahvaa allianssia mielenterveyspalveluita saavien ”riskinuorten” ja heitä hoitavien kliinikoiden välillä edistäviä tekijöitä.

Väitöskirjatyössä havaittiin, että seksuaalinen hyväksikäyttö oli ainoa merkittävä itsetuhoisuutta ennustava tekijä monimuuttuja-analyyseissä. Eloonjäämisanalyysi paljasti, että nuorilla, joiden itsetuhoisuuden seulonnan tulos oli negatiivinen, aika itsetuhoiseen tekoon oli pidempi kuin nuorilla, joilla seulonnan tulos oli positiivinen. Eloonjäämisjakaumien välinen ero oli log-rank-testiä käyttäen merkitsevä. Tutkimus paljasti myös viisi laaja-alaista luokkaa, jotka rakentavat terapeuttista allianssia: 1) ekosysteeminen lähestymistapa, 2) vahva yhteistyö, 3) ammatillisuus, 4) lämpö ja tuki ja 5) avoin viestintä. Kokonaisuutena tämän väitöskirjatyön tuloksia voidaan käyttää ohjaamaan itsetuhoisuuden seulontaa ja hoitomenetelmien käyttöä.

AVAINSANAT: nuorten itsetuhoisuus, yhteisöpohjaiset aineistot, riskinuoret

Table of Contents

Abbreviations

ACEs	Adverse Childhood Experiences
BMHS	Behavioral and Mental Health Services
CATS	Child and Adolescent Trauma Screen
CBBMHCO	Community-Based Behavioral and Mental Health Care Organization
C-SSRS	Columbia Suicide Severity Rating Scale
EHR	Electronical Health Record
EU	European Union
GCM	Group Concept Mapping
GDPR	General Data Protection Regulation
HIPAA	Health Insurance Portability and Accountability Act
LGBTQ	Lesbian, Gay, Bisexual, Transgender, and Queer
LMIC	Low- and Middle-Income Countries
NIH	National Institutes of Health
SES	Socioeconomic Status
SOP	Standard Operating Procedure
STBs	Suicidal Thoughts and Behaviors
VIF	Variance Inflation Factor

List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

I Celedonia, K.L., Valenti, M.W., Compagnucci, M.C., & Wilson, M.L. Community-based health care providers as research participant recruitment gatekeepers: ethical and legal issues in a real-world case example. *Research Ethics*, 2021; 17: 242–250. DOI: 10.1177/1747016120980560

II Celedonia, K.L., Karukivi, M., Abio, A., Valenti, M.W., & Wilson, M.L. Correlates for suicidality among at-risk youth receiving community-based mental health services. *Community Mental Health Journal*, 2023; 59: 335–344. DOI: 10.1007/s10597-022-01011-y

III Celedonia, K.L., Compagnucci, M.C., Minssen, T. & Wilson, M.L. Legal, ethical, and wider implications of suicide risk detection systems in social media platforms. *Journal of Law and the Biosciences*, 2021; 8: 1–11. DOI: 10.1093/jlb/lsab021

IV Celedonia, K.L., Karukivi, M., Valenti, M.W., Geldsetzer, P., & Wilson, M.L. Temporal patterns of suicidality among adolescents receiving behavioral and mental health services in the community: A survival analysis. *Community Mental Health Journal*, 2024; DOI: 10.1007/s10597-024-01334-y

V Valenti, M., Celedonia, K.L., Wall-Parker, A., & Strickler, A. Trust is essential: Identifying trust building techniques from youth providers across the service array. *Children and Youth Services Review*, 2020; 117: Article 105295. DOI: 10.1016/j.childyouth.2020.105295

1 Introduction

Adolescent suicide is a significant public health problem and is the second leading cause of death among adolescents in the United States (Hedegaard, 2020). To prevent adolescent suicide, it is necessary to understand the behavioral and psychological antecedents to suicide, otherwise known as suicidality. Suicidality is an umbrella term that captures all suicide-related behaviors and thoughts, such as attempts, death by suicide, and suicidal ideation or suicide-related communication (Bridge, Goldstein, & Brent, 2006). Rates of suicidality are elevated during adolescence as compared to other developmental stages across the lifespan (Daniel & Goldston, 2009). The high rates of suicidality during adolescence can be attributed to the myriad drastic transitions that occur during this phase of human life. Biological, psychological, cognitive, and social changes create formidable sources of stress in the body and mind that may render adolescents vulnerable to risk factors for suicidality (Gunn & Goldstein, 2017). Additionally, suicidality among adolescents contributes to a high percentage of psychiatric hospitalizations (Goldstein et al., 2008) and is often a precursor to death by suicide (Joiner et al., 2005).

The large body of research that exists on risk factors for adolescent suicidality has primarily drawn from educational settings (i.e. high schools or universities); clinical samples from psychiatric hospitals or university clinics; or population-based samples. Educational-setting samples and population-based samples do not capture adolescents in the community who have experienced acute psychological trauma; it has been noted that university samples may present with lower levels of life stressors than treatment-seeking individuals (Larsen & Pacella, 2016). Indeed, there are relatively few studies that investigate suicidality using samples of at-risk adolescents receiving behavioral and mental health services (BMHS) in the community (McBride et al., 2017). At-risk adolescents are defined as youth who have been exposed to a host of harmful environmental and social factors, which are referred to as Adverse Childhood Experiences (ACEs) (Fernandes-Alcantara, 2018). ACEs are stressful or traumatic events that a youth experiences between birth and 18 years of age, and include unstable housing (i.e homelessness or transience); stressful or chaotic home environments (i.e. domestic violence); absence of social or emotional supports; multiple types of abuse (physical, sexual, and emotional); and neglect

(physical and emotional) (Felitti et al., 1998; Fernandes-Alcantara, 2018). Exposure to these deleterious environmental and social factors may contribute to the development of behavioral and mental health disorders (McGlaughlin et al., 2012), especially among individuals with a pre-existing genetic risk for psychiatric disorders (Baldwin et al., 2022). Degree of exposure to ACEs is also associated with more severe symptom expression (Gu et al., 2022)

Due to the lack of research on suicidality among at-risk adolescents, it is unknown to what extent risk factors for suicidality derived from broader samples of adolescents overlap with this specific sub-population of adolescents. It is possible that patterns of suicidality among at-risk adolescents may differ from other adolescents given the high clinical acuity of this population. Furthermore, most at-risk adolescents with behavioral and mental health diagnoses receive treatment in the community setting at community-based behavioral and mental health care organizations (CBBMHCO), and present with complex psychiatric symptomatology (Farmer et al., 2001). CCBHMCOs provide treatment at clinics established in the community, rather than at university-based clinics, and they are often underfunded and understaffed (Weaver at al., 2013). With scarce resources and one of the most complex clientele, it is therefore imperative to better understand suicidality among at-risk adolescents receiving treatment at CCBMHCOs in order to most effectively intervene, treat, and ultimately prevent death by suicide among this population.

This thesis aims to address this gap in the literature regarding suicidality among at-risk adolescents in the United States by using a mixed-methods approach to understanding the phenomenon, as well as examining possible solutions to suicide prevention. To begin with, a case study of ethical approaches to using community-based samples for research was performed. Correlates and predictors of suicidality were then examined using a cross-sectional study design utilizing data from an electronic health record (EHR) system at a community-based behavioral and mental health care organization. A critical case review of existing suicide detection systems was then conducted to gain a comprehensive understanding of the ethical and legal implications of wide-scale implementation of such systems. An exploratory survival analysis of temporal patterns of suicidality among at-risk adolescents receiving BMHS in the community was subsequently conducted, with the intent of identifying trends in time to first reported suicidal event after intake and initial suicidality risk screening. Finally, qualities that foster strong therapeutic alliances between at-risk adolescents receiving BMHS in the community and their clinicians were examined using the mixed-methods approach of Group Concept Mapping (GCM). It is hoped that a better understanding of techniques that build trust between youth and clinicians will lead to more effective treatment, thereby attenuating suicidality risk.

2 Review of the Literature

2.1 Adolescent Suicidality

2.1.1 Definition of Suicidality

Though suicidality is a term widely accepted in the field as a reference point for the constellation of behaviors and thoughts related to suicide, when studying suicidality, researchers either focus on one aspect of suicidality (i.e. ideation, attempts, or death by suicide), or tackle all components of suicidality simultaneously in their research. Either way, the risk factors for suicidal ideation are not necessarily the same risk factors for suicide attempts. The components of suicidality move along a continuum from mild forms of suicidality to more severe forms, and in this way, suicidality is viewed as a process rather than as a static entity (Mikawa, 1973; Paykel et al., 1974). The progression of suicidality includes the following stages: suicidal ideation, suicide plan, suicide attempt, and death by suicide. Suicidal ideation is defined as "thinking about, considering, or planning suicide" (NIMH, n.d.). Suicide attempt is defined as "non-fatal self-directed potentially injurious behavior with any intent to die as a result of the behavior" (Crosby et al., 2011). Death by suicide is defined as "death caused by self-directed injurious behavior with any intent to die as a result of the behavior" (Crosby et al., 2011).

2.2 Adolescent Suicidality Risk Factors

Epidemiologic research on risk factors for adolescent suicidality indicates numerous factors that are associated with an increased risk of suicidality. These factors range from demographic variables, such as gender, age, and race/ethnicity, to clinical, environmental, and social variables (Cash & Bridge, 2009). Some notable demographic trends include that suicidality seems to increase with age during adolescence. Additionally, although male adolescents have higher rates of death by suicide, females have higher rates of suicide attempts (Brent et al., 1999). American youth of European descent have higher rates of death by suicide compared to non-whites, but death by suicide among African American males seems to be increasing (Joe & Kaplan, 2002).

The presence of a psychiatric disorder is a significant risk factor for suicide and suicidality among adolescents. In a review of adolescent suicides and attempts, 80 to 90% of adolescents who died by suicide or attempted suicide had a psychiatric disorder, the most common being mood, anxiety, conduct, and substance use disorders (Bridge et al., 2006). More specifically, depression is one of the major risk factors for suicide (Spirito & Esposito-Smythers, 2006), and depression is very common during adolescence (Thapar et al., 2012). The incidence of depression spikes after puberty, with this spike being more pronounced among female adolescents (Thapar et al., 2012).

Living environment, family, and social factors also contribute to elevated risk of suicidality among adolescents. Adolescents who moved frequently as children are more likely to engage in suicidal behavior than adolescents that had a stable living environment in childhood (Qin et al., 2009), and the more adolescents have moved as a child, the higher their risk for suicidal behavior. This study, however, only investigated youth who remained with their parents during the move; the effects of moving frequently therefore might be more severe for youth in foster care. Poor relationships with parents and a chaotic family environment are also associated with an increased risk for suicidal behavior among adolescents (Bridge et al., 2006). Finally, problems with peer relationships such as bullying behavior and bullying victimization are associated with higher levels of adolescent suicidal behavior (Benatov et al., 2022; Alavi et al., 2017).

In general, the elevated rates of suicidality among adolescents may be attributed to the neurodevelopmental attributes of adolescence (i.e. prone to impulsivity; immature decision-making faculties) and the distinct socioecological milieu in which adolescents find themselves as they transition from youth to young adulthood (i.e. family conflict precipitated by desire for autonomy; increased significance of peer relationships and their influence) (Reyna & Farley, 2006; Daniel & Goldston, 2009). Additionally, adolescence—especially early adolescence—is a time in which many individuals begin experimenting with the use of substances such as tobacco, alcohol, and illicit drugs (Swendsen et al., 2012). Research has shown that smoking cigarettes or drinking alcohol increases the risk of suicidal ideation among adolescents (Zhang & Wu, 2014), and illicit drug use among adolescents is a strong predictor of both suicidal ideation and suicidal behavior (Ammerman et al., 2018).

Hormonal changes that occur during adolescence may also explain the elevated rates of suicidality during this developmental period (Manceaux et al., 2015). Common risk factors for suicidality like impulsivity and depression can be attributed to accelerated development of the limbic system during adolescence and hormone-driven higher sensitivity of the serotoninergic system and to glucocorticoids. These same hormonal changes could also explain gender differences in suicidality patterns. As mentioned earlier, the spike in incidence of depression after puberty is more

pronounced among females, and depression is strongly associated with suicidality (Thapar et al., 2012).

In fact, Ho et al. (2022) argue that puberty is largely influential in the manifestation of suicidality during adolescence and perhaps the main driver behind the organizational and structural changes of the brain that may serve as risk factors for suicidality during adolescence. The increase in neuroendocrinological activity that occurs during puberty plays a pivotal role in shaping the growth and formation of neural circuitry that influences psychological and behavioral qualities associated with suicidality, namely emotion regulation and impulse control. The cascade of sex hormones that floods the brain during adolescence triggers a pronounced plasticity in the neural circuitry that is attuned to social contexts and subsequently responsible for the regulation of the psychological response to social stressors. Oppenheimer et al. (2020) found that sensitivity to rejection was pronounced in certain areas of the adolescent brain and that this sensitivity to rejection was in turn correlated with suicidality.

Figure 1 shows the cortical development of the brain as it transitions from childhood to adolescence to early adulthood. The image illustrates the progressive decrease in the density of gray matter (with red representing higher densities of gray matter and indigo representing lower densities of gray matter) between the ages of five and twenty years. Note that the image of the brain that corresponds with adolescence exhibits a variety of colors, and therefore densities, visually depicting the state of change that the brain is in during adolescence,

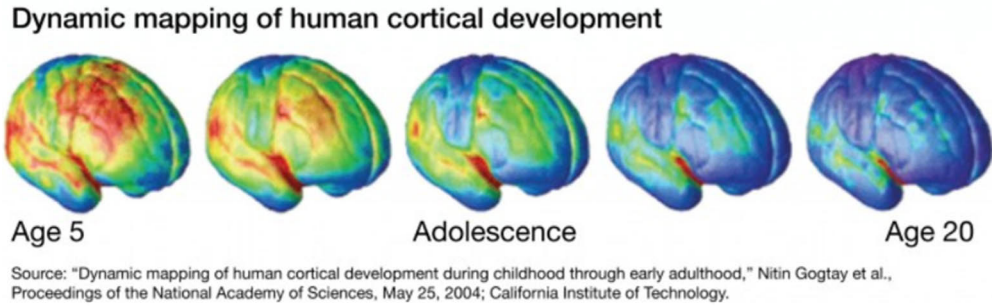

Figure 1. Human Cortical Development Between Ages 5 and 20 Years.

Moreover, adolescents who are uniquely sensitive to the hormonal changes that occur during puberty, perhaps due to unfortunate life circumstances such as exposure to adverse experiences, may be more acutely impacted by the effects puberty has on neurodevelopment (Ho et al., 2022). This could be due in large part to the alterations in areas of the brain associated with emotion processing and regulation—the amygdala, hippocampus, and prefrontal cortex—that appear to result from exposure to

adverse, stress-laden experiences during childhood and adolescence (Eiland & Romeo, 2013).

2.3 Suicidality Among At-Risk Adolescents

To reiterate, the large body of extant research on risk factors for adolescent suicidality has been conducted mostly using samples from educational settings (i.e. high schools or universities); clinical samples from inpatient psychiatric hospitals or university clinics; or population-based samples. Research that examines suicidality using samples of at-risk adolescents receiving BMHS in the community is scarce (McBride et al., 2017). At-risk adolescents are defined as youth who have been or continue to be exposed to a wide range of deleterious environmental and social factors, which are commonly referred to as Adverse Childhood Experiences (ACEs) (Fernandes-Alcantara, 2018). ACEs are stressful or traumatic events that happen between birth and 18 years of age, and include homelessness or transient living environment; chaotic or unsafe home environments (i.e. domestic violence); lack of social or emotional supports; different forms of abuse (physical, sexual, and emotional); and neglect (physical and emotional) (Felitti et al., 1998; Fernandes-Alcantara, 2018). Exposure to ACEs may influence the subsequent development of behavioral and mental health disorders (McGlaughlin et al., 2012), and the degree of exposure to ACEs is associated with increased symptom severity (Gu et al., 2022).

At-risk adolescents often present with high clinical acuity and are notoriously difficult to treat, even in sophisticated, well-funded treatment settings (Bonadio & Tompsett, 2018). Additionally, at-risk adolescents are often involved in multiple systems, such as foster care, child protection services, and the juvenile justice department (Zajac et al., 2015). In the community setting where clinical resources are scarce, it is even more challenging to treat complex clinical populations. ACEs have been found to be associated with increased suicidality risk. For example, adolescents who have experienced sexual abuse or physical abuse have an increased risk of suicidal ideation and behavior (Fergusson et al., 2008). Cumulative trauma—which means experiencing more than one traumatic event—may lead to an even more pronounced and elevated risk of suicidality (Johnson, 2017). A study done by Dube et al. (2001) found that each individual ACE item that is experienced increases the odds of suicide attempt by two- to five-times, and for each additional ACE that an individual reports they have experienced, suicidal behavior increases exponentially. Furthermore, compared to adolescents who have not experienced traumatic events, adolescents who have experienced traumatic events like ACEs are three-times more likely to be suicidal (Brown et al, 1999).

The Childhood Trauma Model offers a framework for understanding why suicidality may be elevated among at-risk adolescents, as it posits that exposure to trauma

early in life predicts suicidality and associated symptoms of distress (Johnson, 2017). Additionally, research suggests that ACEs disrupt the body's ability to adapt to stressors and maintain physiological stability, a process known as *allostasis* (Danese & McEwan, 2012). The nervous, endocrine, and immune systems work synergistically to facilitate the allostatic process, and ACEs have been found to significantly disrupt the normal functioning of each of these three systems, contributing to what is known as allostatic load and its more serious presentation, allostatic overload (Danese & McEwan, 2012). For children and adolescents in particular, ACEs appear to interfere with the normal development of these systems. Given the role that the nervous and endocrine systems play in regulating mental health and the rapid development, changes, and sensitivity of these systems during adolescence, experiencing allostatic load or overload during adolescence—like many at-risk adolescents do—may offer an additional explanation as to why suicidality is elevated among this sub-population.

Due to the lack of research on suicidality among at-risk adolescents, it is unknown to what extent risk factors for suicidality derived from broader samples of adolescents overlap with this specific sub-population of adolescents. It is possible that patterns of suicidality among at-risk adolescents may differ from other adolescents given the high clinical acuity of this population. Furthermore, most at-risk adolescents with behavioral and mental health diagnoses receive treatment in the community setting and present with complex psychiatric symptomatology (Farmer et al., 2001). It is therefore imperative to better understand suicidality among this unique population in order to most effectively intervene, treat, and ultimately prevent death by suicide.

2.3.1 Suicidality Risk Factors for At-Risk Adolescents

No substantive systematic reviews of suicidality among at-risk adolescents have been conducted. This represents an important gap in the literature given that at-risk adolescents have often been exposed to numerous environmental and social stressors that may increase their risk of suicidality. Therefore, determining whether the established risk factors for adolescent suicide are relevant to at-risk adolescents is important for suicide prevention efforts among this unique population.

The aim of the systematic review was to identify all studies that reported risk factors for suicidality among at-risk adolescents. CINAHL Plus, Pubmed, PsycInfo, and SCOPUS were searched to obtain relevant articles published between 01 January 2009 and 31 December 2018. Standardized search terms were used, including MeSH terms for suicide and other terms associated with 'intentional harm', 'at-risk', 'youth' and 'community mental health services.' Articles and citations were downloaded from the respective databases, and then organized and reviewed using Microsoft Excel. Gray literature results (e.g. unpublished literature, governmental reports) were also sought using other data sources, such as Google Scholar.

This review included studies of any design, including cross-sectional and intervention studies, and dissertations, except for qualitative studies, case studies, systematic reviews (n=25) and meta-analyses (n=6). None of the systematic reviews or meta-analyses pertained to the topic of the present systematic review. Studies were only included if the study population age included some or all of the range of 12 to 18 years in order to focus on risk factors for suicidality in adolescents.

In intervention studies, follow-up outcomes were analyzed to determine possible long-term effects of risk factors. All studies, regardless of language, were included in the search strategy; however, due to language restrictions, only articles written in English, French, or Spanish were included during the screening stages. Studies from all countries were included. As this review was analyzing risk factors for intentional suicide-related behavior and self-harm, studies that only examined unintentional self-harm were excluded.

At all stages of the review process, all articles were screened by two independent reviewers. Titles were screened to remove duplicates and to include articles with potential risk factor data. At the title review stage, if either reviewer considered an article to be relevant, the abstract was reviewed. If the reviewers disagreed on inclusion of an article during the abstract and full text review stages, a consensus was reached. For the full articles included in the final study, the articles were reviewed in-depth and a literature review matrix was completed, to include pertinent information on each study such as population, sample size, how suicidality was measured, and the main findings from the study.

Meta-analyses were not performed due to the varied study designs included in the final study. Studies were grouped into four categories of suicidality: suicidal ideation, suicide attempt, suicide-related behavior/self-harm, and death by suicide. Though not included in the classic definition of suicidality described earlier in this paper, it was decided to include studies that investigated suicide-related behavior/self-harm given that it is sometimes difficult to ascribe intent to self-injurious behavior, and therefore it may be misclassified. Suicide-related behavior/self-harm are acts of self-injury with no suicidal intent or an undetermined degree of suicidal intent (Silverman et al., 2007). When the study authors explicitly stated an outcome, the outcomes were classified as such, e.g. outcomes were classified as ‘suicidal ideation’ when the authors specifically stated, ‘suicidal ideation.’ If multiple outcomes were described in the same study, results were presented for all risk factors and outcomes.

The National Institutes of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-sectional Studies was used by the independent reviewers to conduct a quality evaluation of the study data. Scores (‘Good’, ‘Fair’, ‘Poor’) were given for criteria regarding a study’s study population, selection criteria, sample size, outcome measurement, bias, confounding, chance and internal validity. Each section received a score of yes, no, or N/A depending on whether the study met the criteria

and studies were given a final Quality Rating of 'Good', 'Fair', or 'Poor' depending on the number of 'no' scores they received. The majority of the studies included in this review received a "no" for describing a sample size justification, power description, exposures measures prior to outcome, and whether the outcome assessors were blinded to the exposure status of participants.

The initial search identified 16, 821 potentially relevant peer reviewed articles. After removing duplicates, the title review was started with 13, 510 peer reviewed articles. The title review resulted in 417 articles to be included in the abstract review. From the abstract review, 57 articles were included in the full-text review. Thirty-eight peer reviewed articles were included in the final systematic review. See Figure 2 for a flow chart of the search process.

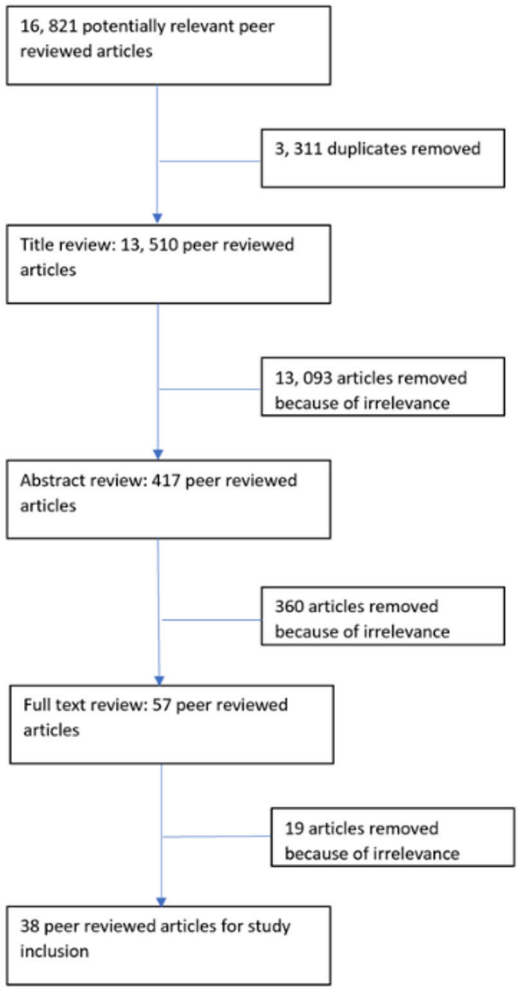

Figure 2. Search Process for Systematic Literature Review.

The final included articles were from ten countries: United States of America, Canada, United Kingdom, Australia, Sweden, Denmark, Russia, Greenland, Taiwan, and Sri Lanka. A summary of the findings from the articles has been organized into three categories of suicidality: suicidal ideation, suicide attempt, and suicide-related behavior/self-harm. No studies on death by suicide were included in the final article set. Seven articles studied suicidal ideation and suicide attempt concurrently though as separate variables of suicidality in their study design. Therefore, when reporting on the article count for these two categories of suicidality, the sum of articles across the categories will exceed the thirty-eight articles included in the final review, as these seven articles will be counted twice, once in the suicidal ideation category and once in the suicide behavior/attempt category.

Eighteen articles studied risk factors for *suicidal ideation*. Three of the articles had a Good Global Score, eleven articles had a Fair Global Score, and four articles had a Poor Global Score. Findings from these articles indicate that female gender (Zapata et al., 2013; Tapia et al., 2015); child maltreatment (to include physical and sexual abuse) (Thompson et al., 2010; Zapata et al., 2013; Kretschmar & Flannery, 2011); bullying perpetration and victimization; interpersonal violence exposure (Hatcher et al., 2018); depression (Armstrong & Manion, 2015; Anderson, 2011); traumatic stress; engaging in violent crime; sex trafficking victimization (Frey et al., 2019); unstable living environment; association with depressed peers; weak relationships with parents and peers; risk behaviors; association with deviant peers; low self-esteem; high level of anger; and implicit identification with death were associated with suicidal ideation.

Eighteen articles studied risk factors for *suicide attempt*. Five of the articles had a Good Global Score, seven articles had a Fair Global Score, and six articles had a Poor Global Score. Findings from these articles indicate that female gender (Moskowitz et al., 2013; Perez et al., 2016; Maimon et al., 2010); Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) status; bullying victimization; child maltreatment (physical and emotional abuse and neglect; sexual abuse) (Brockie et al., 2015; Bruffaerts et al., 2010); sex trafficking victimization (Frey et al., 2019); residing in a low-income neighborhood; recent stress; depression (Maimon et al., 2010; Cwik et al., 2015); post-traumatic stress disorder; family discord; unstable living environment; prior psychiatric hospitalization; interpersonal violence exposure (Brockie et al., 2015); residential placement; referral to shelter care; emotion regulation difficulties; lack of a trusted adult at home or at school; death of a family member or friend; verbal abuse; and impaired social functioning and problem solving were all associated with suicide attempts.

Four articles studied risk factors for *both suicidal ideation and suicide attempt*, treating suicide ideation and suicide attempt as one variable of suicidality. Two articles received a Good Global Score, one article received a Fair Global Score, and one

article received a Poor Global Score. Findings from these articles indicate suicidality is correlated with female gender, loneliness, depression, anxiety, peer victimization, functional impairment, externalizing symptoms, trauma, and involvement in the special education system (Quigora & Walton, 2014; Johnson 2017; McBride et al., 2017; Chavira et al., 2010).

Four articles studied risk factors for *suicide-related behavior or self-harm with and without suicidal intent*. Three of the articles had a Good Global Score, and one article had a Fair Global Score. Lower parental socioeconomic status (SES) was associated with increased risk of adolescents engaging in self-harm with suicidal intent, but not self-harm without suicidal intent (Page et al., 2014). Child maltreatment was associated with increased risk of suicide-related behavior and self-harm (Rhodes et al., 2012). Significantly higher levels of depression and anxiety and lower levels of self-esteem were reported among self-harming adolescents as compared to non-self-harming adolescents (Knowles et al., 2011). Self-harm was also associated with being female, sexual abuse, exposure to self-harm by friends, and previous history of self-harm ideation (Hettiarachchi et al., 2018).

Of the thirty-eight studies included in the literature review, thirteen studies (34%) had Good Global Scores, seventeen studies (45%) had Fair Global Scores, and eight studies (21%) had Poor Global Scores.

With only one third of the thirty-eight articles on suicidality among at-risk adolescents receiving Good Global Scores on the NIH Quality Assessment Tool, there is opportunity for more research on risk factors for suicidality among this population to be conducted. However, even with the shortcomings in the current literature, the findings from the systematic review provide insight into the risk factors for suicidality among at-risk adolescents. These insights can be used to form a preliminary profile of suicidality risk factors unique to at-risk adolescents, as well as inform future research on this important topic.

It seems there are certain factors that are common across the suicidality continuum for at-risk adolescents. Female gender was found to be associated with increased risk of suicidal ideation, suicide attempt, and suicide-related behavior/self-harm (Moskowitz et al. 2013; Perez et al, 2016; Maimon et al. 2010; Zapata et al., 2013; Tapia et al., 2015; Quigora & Walton, 2014; Hettiarachchi et al. 2018). One explanation for this could be the increased prevalence of psychiatric disorders like depression and anxiety among females; depression and anxiety are often associated with increased risk of suicidality (Thapar et al., 2012). Yet another explanation could be the aforementioned hormonal differences between the sexes that are present during adolescence.

Across the studies included in the final review, more attention was given to internalizing mental health disorders than externalizing disorders. The presence of depression was found across the suicidality continuum (Maimon et al., 2010;

Armstrong & Manion, 2015; Knowles et al., 2011). This finding is in accordance with the larger body of research on adolescent suicidality which has repeatedly found that depression is strongly associated with increased risk of suicidality (Spirito & Esposito-Smythers, 2006). This is especially poignant given that rates of depression among adolescents in general have increased over the past decade (Mojtabai et al., 2016). Though externalizing behaviors like impulsivity are common risk factors for suicide attempts and death by suicide, no studies in the final review specifically studied impulsivity. However, two studies did study "externalizing symptoms" and "involvement in violent crime," both of which were associated with some form of suicidality (Tapia et al., 2015; McBride et al., 2017).

Bullying victimization was also found to be a common risk factor across the suicidal behavior continuum among at-risk adolescents. Again, this is in accordance with the literature on suicidality risk factors among the general adolescent population (Benatov et al., 2022; Alavi et al., 2017). Both the nature and length of exposure to bullying play a role in suicidal behavior. Relational violence (teasing, mocking, and reputational harm) has been found to increase suicide attempt to a greater extent than physical violence among adolescents (Barzilay et al., 2017). The existing gender disparity in bullying typology (females being more likely to engage in and experience relational violence) may also explain some of the variability in suicide attempts by gender when bullying type has been adjusted for in regression models. The implication is that female adolescents may be more predisposed to suicide attempt when the type of bullying victimization is taken into account.

More recent work has also documented that the gender gap in suicide rates may be narrowing due to an increase in female suicide (Ruch et al., 2019). One of the emerging themes in suicide research is the relationship between social media use and suicidal behavior. Online bullying is primarily relational in nature (Hinduja & Patchin, 2010). This suggests that female adolescents, who, to a larger extent, use social media (Lenhart et al., 2010), are potentially more susceptible to the types of bullying which occur in online platforms (Kelly et al., 2018). The latter is somewhat supported by research showing that social media use among girls was linked to stronger depressive symptoms compared to boys (Kelly et al., 2018). It is also important to note the growing body of evidence suggesting that gender non-conforming or gender minorities have unique social and environmental considerations which may not be adequately measured in studies that primarily target gender conforming population samples (Toomey et al., 2018).

Among at-risk adolescents, unstable living environment was associated with increased risk of suicidal ideation and suicide attempt. Though this corroborates the findings of a previous study that revealed an association between number of moves during childhood and suicidality, the youth in this study moved with their biological family unit (Qin et al., 2009). At-risk adolescents are likely to come from single-

parent homes and/or be involved in the foster care system. Therefore, the moves they experience may be characterized by alternating between father and mother, or even relatives, or moving from foster home to foster home. These types of moves may have a more negative impact on children and adolescents than moves that are conducted with the biological family unit.

Sex trafficking victimization was also associated with increased risk of suicidal ideation and suicide attempt among at-risk adolescents (Frey et al., 2019). This is an important finding that deserves more attention in the research among this population, as at-risk adolescents, particularly females, are at an increased risk of becoming victims of sex trafficking rings given that they do not have stable living environments and often engage in risky behavior that puts them at risk of sex trafficking, such as running away (Fedina et al., 2019). Understanding the psychological effects of sex trafficking victimization, particularly as it relates to suicidality, is a crucial part of delineating the suicidality risk profile for this sub-population of adolescents.

Child maltreatment—to include physical and emotional abuse and neglect, and sexual abuse—was associated with suicidal ideation, suicide attempt, and suicide-related behavior/self-harm among at-risk adolescents (Brockie et al., 2015; Bruffaerts et al, 2010; Thompson et al., 2010; Zapata et al., 2013; Kretschmar & Flannery, 2011; Johnson 2017; Rhodes et al., 2012; Hettiarachchi et al., 2018). This finding corresponds with the extant literature on adolescent suicidality that has found child maltreatment to be significantly associated with increased risk of suicidality (Fergusson et al., 2008). Among at-risk adolescents, child maltreatment may be more prevalent than compared to the general adolescent population. In a longitudinal study of risk factors for child maltreatment (Brown et al., 1998), it was found that prevalence of child maltreatment was 24% when four or more risk factors were present as opposed to 3% when no risk factors were present. These risk factors include variables such as low-income, welfare dependency, single-parent homes, early separation from mother, and low maternal and parental involvement. For many at-risk adolescents, these risk factors are their reality.

Interpersonal violence exposure was associated with suicidal ideation and suicide attempt (Brockie et al., 2015; Hatcher et al., 2018; Johnson, 2017). This is another finding that deserves more attention as at-risk adolescents are more likely to be exposed to forms of interpersonal violence such as domestic violence than the general adolescent population. The repeated exposure to familial discord has been found to exact negative influence on the neurological development of children and adolescents (Meuller & Tronick, 2019; Tsavoussis et al., 2014). This could explain why the risk for suicidality is increased among children and adolescents who come from homes characterized by repeated episodes of domestic violence.

One methodological issue this systematic review has revealed is the variability in the way in which suicidality is defined and studied. Different methods, tools, and

definitions were used across all the articles included in the final review. For many of the articles, the lack of a clear definition and description of how suicidality was measured resulted in global ratings of either “Fair” or “Poor.” The problem of defining suicidality is not unique to research on suicidality among this sub-population of adolescents. Suicidality researchers have highlighted the need for a stricter operational definition of suicidality and its components (Kidd, 2003). The absence of consistent operational definitions impedes suicide research, affecting its quality and capacity to truly understand the phenomenon of suicidality (de Leo et al., 2004).

Understanding risk factors for suicidality is essential to preventing death by suicide. Though much research has been conducted on suicidality among the adolescent population in general, research specific to suicidality trends and risk factors among at-risk adolescents is lacking. This systematic review suggests that common risk factors for adolescent suicidality may apply to at-risk adolescents, but the quantity and quality of studies available on the topic makes it difficult to draw decisive conclusions. More rigorous studies investigating suicidality among at-risk adolescents are needed to formulate a clear risk profile for this sub-population of adolescents.

2.4 Suicide Prevention

Suicide prevention remains a challenge despite well-established risk factors for suicidal behavior. The difficulty in preventing suicide is due in large part to the sudden nature of a considerable amount of suicide attempts (Paashaus et al., 2021). It is common for the time between decision to die and actual suicide attempt to take less than ten minutes (Deisenhammer et al., 2009), and often even less than five minutes (Simon et al., 2001). Despite this unfortunate reality, there are numerous interventions and programs that are effective in reducing the risk of death by suicide by attenuating the antecedental presence of suicidality.

2.4.1 Approaches to Suicide Prevention

Approaches to suicide prevention are varied and range from microlevel approaches, focusing on the individual as the point of intervention (Brown & Jager-Hyman, 2014), to more macrolevel approaches that use a public health framework to preventing death by suicide (Calear et al., 2016). One individual-focused approach to suicide prevention that has recently emerged in the field of psychology and psychiatry is clinical suicidology. This innovative approach to suicide prevention focuses on suicidality as the target for treatment and intervention, rather than traditional suicide prevention approaches that focus on the psychiatric disorders that are often associated, or co-occur, with suicidality (i.e. major depression, anxiety disorders, etc.) (Jobes et al., 2015).

Some health professionals argue that conceptualizing suicide prevention as a public health issue may be more effective at preventing death by suicide than interventions that are individual-focused and driven by clinical, disease management models. Guohua (2023) suggests that suicide prevention efforts should be guided by the Haddon Matrix (Haddon, 1968), a well-established conceptual framework that is used to inform injury prevention strategies and efforts. Drawing on the field of epidemiology, the Haddon Matrix uses the epidemiologic triad of agent, host, and environment to understand injury and its three phases—pre-injury, injury, and post-injury. See Figure 3 for an example of the Haddon Matrix as it applies to suicidality.

HADDON MATRIX	Host	Agent	Physical Environment	Social Environment
Pre-Injury	Depression, Relationship Conflict	Poor Problem-Solving Skills, Coping Skills	Access to Various Prescription Medications	Lack of Social Supports, Lack of Healthy Relationships
Injury	Impulsive Self-Harming Behavior	Overdose on Prescription Medications	Isolated Living Situation (i.e. Rural)	Home Alone, Delayed Medical Attention
Post-Injury	Compromised Breathing	Mild Hypoxia	Some Brain Damage	Mild Cognitive Impairment

Figure 3. Example of Haddon Matrix for Suicide Attempt.

Clinical approaches, like screening and novel interventions such as clinical suicidology, while important to suicide prevention efforts, only focus on the host component of the Haddon Matrix. According to the conceptual framework of the Haddon Matrix, this would be an incomprehensive approach to suicide prevention, as it does not factor in the etiologic agent and environmental components of the epidemiologic triad. In fact, according to Guohua (2023), the intervention of limiting access to lethal means, which involves intervention at the environmental level by way of manipulating environmental surroundings, is one of a handful of suicide prevention tactics that boasts empirical proof of effectiveness in decreasing deaths by suicide. Implementation of wide-scale, population-based suicide prevention strategies have the

capacity to reach more individuals at risk of suicide, thereby preventing more deaths by suicide. In addition to limiting access to lethal means, another wide-scale, population-based approach to suicide prevention could be the application of technology, such as artificial intelligence and machine learning, to suicide prevention initiatives.

Rapid developments in artificial intelligence, and in particular, machine learning, over the past decade have created opportunity for more effective, population-based suicide prevention efforts. Social media platforms have incorporated suicide risk detection algorithms into their end-user products in the hopes of reaching more individuals at risk of suicide. Given that a large proportion of adolescents use social media (Pew Research Center, 2022), the use of suicide detection algorithms could have the capacity to reach a large number of adolescents at risk of suicide, thereby preventing adolescent death by suicide. However, there is debate among health professionals and scholars as to whether social media is the solution to adolescent suicidality and death by suicide, or if social media is responsible for perpetuating suicidality either through contagion (Peralta 2023) or exacerbating the symptoms of common co-occurring psychiatric disorders such as major depression (Ivie et al., 2020). In particular, the social media platform, Facebook, has been at the center of the debate around the role social media platforms play in suicide detection using algorithms (Barnett & Torous, 2019).

Furthermore, research on the wide-scale suicide detection systems that social media have implemented is in its infancy, and ethical evaluations of the suicide detection systems have been done by researchers affiliated with the social media platforms (de Andrade et al., 2018), which introduces bias in the assessment of the ethical nature of these systems. In a systematic review of research on artificial intelligence and suicide prevention, only seventeen studies conducted between 2014 and 2020 met inclusion criteria for the review and were deemed as relevant (Lejeune et al., 2022). It is therefore too soon to make a definitive conclusion about the effectiveness of technology-driven approaches to suicide prevention.

3 Aims

Suicidality among at-risk adolescents receiving behavioral and mental health services in the community is an under-researched topic. To better understand how to conduct research on suicidality among this sub-population of adolescents, as well as to understand the nature of suicidality among at-risk adolescents and how to best provide treatment to this population, this thesis had the following aims: 1) to outline an ethical approach to recruiting research participants from community-based behavioral and mental health care organizations; 2) to study correlates and predictors of suicidality among at-risk adolescents receiving behavioral and mental health services in the community; 3) to critically examine wide-scale suicide detection systems; 4) to study trends in time to suicidal behavior after an at-risk adolescent is admitted to services at a community-based behavioral and mental health care organization; and 5) to investigate the qualities that help build and maintain strong therapeutic alliances between clinicians and at-risk adolescents receiving behavioral and mental health care services in the community.

4 Materials and Methods

4.1 Setting

The studies for this thesis were conducted at a multi-state community-based behavioral and mental health care organization (CBBMHCO) in the United States that has been providing services in and to the community for almost two hundred years. The organization provides a variety of behavioral and mental health services to youth, families, and adults in the community. There are five different service lines housed within the organization, and all services are delivered in the community. The five distinct services lines are: 1) residential services; 2) community-based services (i.e. crisis response, in-home family-based services); 3) outpatient mental health services; 4) treatment foster care and adoption; and 5) special education. Referral to services at the organization are either self-referrals or referrals that are made by external systems, such as child protection services or the juvenile justice department.

4.2 Study I

4.2.1 Procedures

Study I aimed to provide guidance on how to ethically conduct research with community samples. Case study methodology was used to examine and describe the standard operating procedure (SOP) used by a CBBMHCO to determine whether external research entities may access their clientele for research recruitment purposes, and an example of how the SOP worked when applied to a real-world case was provided. The author, Karen Lynn Celedonia, is an employee of the CBBMHCO that was studied and had participated in the steps outlined in the SOP, providing valuable first-hand knowledge of the process. She carefully examined the SOP and meticulously reviewed each step of the SOP.

4.2.2 Case Selection and Analysis

Once the SOP was examined and described, a case of an actual external researcher who solicited the CBBMHCO for access to its clientele for research purposes was

selected for analysis to see how the SOP worked in action. This case was selected due to the high-risk nature of participation in the proposed study of the external researcher. In this sense, it was an extreme case, as most of the external researchers who approach the CBBMHCO for access to clientele for research recruitment purposes are conducting research that is deemed low-risk to participants. By selecting an extreme case for analysis, it highlighted the effectiveness of the SOP at protecting clientele from potential risks associated with participating in a study conducted by external researchers. Documentation and notes from the SOP process pertaining to this case were reviewed as part of the case study analysis.

This case illustrated the importance of the SOP in protecting the rights and privacy of community members receiving behavioral and mental health services at CBBMHCOs. The study that was being proposed by the external researcher involved having participants use a wearable electronic device to track their movements. These devices collect user data, and in the instance of this particular device, the external researcher was not able to provide information on how user data would be stored and protected. The case study analysis revealed that this "red flag" was detected by the CCBMHCO's internal research review committee as part of the SOP process, and the external researcher was subsequently denied access to the CBBMHCO's clientele for research recruitment purposes. Had the SOP not been in place, the external researcher likely would have been granted access to recruit clients for research they were conducting on a wearable electronic device.

4.3 Study II

4.3.1 Participants

Study II was a cross-sectional study that investigated the prevalence, correlates, and predictors of suicidality among at-risk adolescents receiving BMHS in the community. Upon approval from the CBBMHCO's internal research review committee, data for the study were extracted from the CBBMHCO's electronic health record (EHR) system. In order to be included in the study for analysis, participants had to have a suicidality risk screener completed at intake and a completed trauma screener, as some of the independent variables were derived from the trauma screener (see below for more detail). A final sample of 289 adolescents aged 13–18 years old was derived from EHR system data using the time frame of July 1, 2019 to June 30, 2020 (Fiscal Year 2020). All data were deidentified after extraction from the EHR system.

On average, youth were 15.6 years old. Females and males were equally represented in the sample, with about half of the youth being female (52%) and the other half being male (48%). There were no youth who identified as transgender. Two-thirds of the youth were White (66%), 22% were Black or African American, 10%

were Bi- or Multi-racial, and 2% were Hispanic/Latino or Asian. Most of the youth were either receiving community-based services (33%), outpatient mental health services (28%), or residential services (27%), with only 11% receiving treatment foster care and adoption services, and 1% receiving special education services (a type of instruction designed to meet the needs of children with disabilities). The most common primary diagnosis at intake was Trauma and Stressor Related Disorders (20%). Other common primary diagnoses among the youth in the sample included ADHD (16%), Disruptive, Impulse-Control, and Conduct Disorders (15%), and Depressive Disorders (13%). The DSM-5 was used as the diagnostic system.

4.3.2 Data

The dependent variable of suicidal behavior was derived from the Columbia Suicide Severity Rating Scale (C-SSRS). The C-SSRS is a standardized measure of suicidality risk that boasts well-established psychometrics (Posner et al., 2011), and it is commonly used by behavioral and mental health professionals (i.e. researchers and clinicians) to assess suicidal behavior and suicide risk. The C-SSRS-Screener is a 6-question suicidality risk screen that measures suicidal ideation, planning, and attempts. For the purposes of **Study II**, a suicidality risk screen was considered positive if youth answered "Yes" to Question 1 ["Have you wished you were dead or wished you could go to sleep and not wake up?"], Question 2 ["Have you actually had any thoughts of killing yourself?"], or Question 6 ["Have you ever done anything, started to do anything, or prepared to do anything to end your life?"].

Two dichotomized dependent variables of suicidal behavior were created for the analysis: 1) 1 = Suicidal Behavior Present [Yes to Question 1, Question 2, OR Question 6] and 0 = No Suicidal Behavior Present, and 2) 1 = Suicidal Behavior Present [Yes to Question 1, Question 2, AND Question 6] and 0 = No Suicidal Behavior Present. Additionally, separate analyses for suicidal ideation and suicide attempt were conducted. For suicidal ideation, youth had to answer "Yes" to Question 1 or Question 2. For suicide attempt, youth had to only answer "Yes" to Question 6. The suicide variables were not exclusive, which means participants could be included in more than one category.

Independent variables studied were gender, race, psychiatric diagnosis, and trauma/adverse experiences, to include bullying victimization, sexual abuse, physical abuse, domestic violence exposure, loss of loved one, impulsivity, and anger. The gender, race, and psychiatric diagnosis variables were obtained from client records, and the trauma/adverse experiences variables were derived from the Child and Adolescent Trauma Screen (CATS). Table 1 shows how the trauma/adverse experiences variables were derived from the CATS.

Table 1. Independent Variable Derivation from the Child and Adolescent Trauma Screen (CATS).

SURVEY QUESTION	CODING	VARIABLE
Threatened, hit, or hurt badly within the family	Yes (1); No (0)	Physical Abuse
Someone doing sexual things to you or making you do sexual things to them when you couldn't say no. Or when you were forced or pressured	Yes (1); No (0)	Sexual Abuse
Someone bullying you in person. Saying very mean things that scare you OR Someone bullying you online. Saying very mean things that scare you	Yes (1); No (0)	Bullying Victimization
Seeing someone in the family threatened, hit, or hurt badly	Yes (1); No (0)	Domestic Violence
Doing unsafe things	Once in a while, Half the time, or Almost always (1); Never (0)	Impulsivity
Someone close to you dying suddenly or violently	Yes (1); No (0)	Loss of Loved One
Feeling mad. Having fits of anger and taking it out on others	Once in a while, Half the time, or Almost always (1); Never (0)	Anger

4.3.3 Analysis

The first analyses that were performed examined the distribution of the independent variables within the dichotomized suicidal behavior variables, suicidal ideation variable, and suicide attempt variable. Pearson's chi-square test for categorical variables was used to assess the statistical significance of differences between suicidality among the variables. For independent variables that were statistically significant at the bivariate level ($P < 0.05$), a logistic regression model that adjusted for these variables was developed and tested. The bivariate analysis was performed using SPSS 25, and the logistic regression was performed using R Studio 3.5.3. Multicollinearity was tested on all four models using the variance inflation factor (VIF). All VIF values were around 1, which indicates that multicollinearity was absent. The absence of multicollinearity is desirable because it indicates that there is no correlation among the independent variables.

4.4 Study III

Applying a critical case review methodology, **Study III** examined wide-scale suicide detection systems that were developed and are being used by social media

platforms, with particular focus on Facebook. An international, multi-disciplinary team of scholars with expertise in psychology, public health, and biomedical law reviewed existing information and laws related to privacy and perception of mental health disorders and suicide within a global context. The co-authors with biomedical law expertise conducted an in-depth review of existing legislation designed to protect the privacy of health information, namely the Health Insurance Portability and Accountability Act (HIPAA) in the United States, and General Data Protection Regulation (GDPR) in the European Union (EU). The co-authors with psychology and public health expertise used Childress and Beauchamp's four principles of health care ethics to frame discussion around a social media platform assuming the role of a health care provider by collecting and acting upon mental health data of its users. The information was synthesized, and legal, ethical, and wider implications of the use of these suicide detection systems were formulated by the team.

4.5 Study IV

4.5.1 Participants

Study IV was an exploratory survival analysis of time from suicidality risk screen at intake at a CBBMHCO to suicidal event. Data were extracted from the EHR system of the CBBMHCO. All suicidality risk screens completed at intake for adolescents ages 13–18 years between July 1, 2019 and June 30, 2020 were extracted from the EHR system (N=1,175). The average age of youth in the sample used for analysis was 15.98 years. Almost half of the youth were female (n=539; 46%), and little more than half of the youth were White (n=724; 62%). The most common psychiatric diagnoses were Trauma and Stressor Related Disorders, with one fifth of the youth receiving this diagnosis at intake (n=240; 20%), and Neurodevelopmental Disorders, also with around one fifth of youth receiving this diagnosis at intake (n=224; 19%). There were no instances of a participant dying from causes other than death by suicide. The average length of stay in services was 428.40 days.

4.5.2 Data

As with **Study II**, the C-SSRS was used as the suicidality risk screener. For the purposes of **Study IV**, to screen positive for suicidality risk youth had to answer "Yes" to Question 1 ["Have you wished you were dead or wished you could go to sleep and not wake up?"], Question 2 ["Have you actually had any thoughts of killing yourself?"], or Question 6 ["Have you ever done anything, started to do anything, or prepared to do anything to end your life?"]. A dichotomized variable of a positive suicidality risk screen was created: 1=Positive Suicidality Risk Screen [Yes to

Question 1, Question 2, OR Question 6] and 0=Negative Suicidality Risk Screen [No to Question 1, Question 2, and Question 6]. The C-SSRS assesses for suicidality risk, and as such, collects data on the suicidal history of an individual; the questions it asks are if the individual has experienced any suicidal symptoms within the past 30 days. It does not assess whether an individual is currently suicidal.

Suicidal events were also extracted from the EHR system. Suicidal events are suicidal symptoms that occur while an individual is in treatment, after initial intake to services and initial suicidality risk screening. Clinicians at the CBBMHCO are expected to enter the occurrence of suicidal events into the EHR system using the following types of suicidal events: suicidal ideation, suicidal gesture (thoughts or threats regarding suicide accompanied by an attempt at self-harm without the expectation that the attempt will be lethal), suicide attempt (a non-fatal, self-directed, potentially injurious behavior with the intent to die as a result of the behavior), and non-suicidal self-injury (NSSI). A custom report built in the EHR system retrieves this information from the system. This report was used by the research team to extract data on suicidal events to use for analysis. For analysis purposes, the suicidal events were collapsed and coded in a binary fashion (1=Suicidal Event Occurred; 0=No Suicidal Event Occurred).

4.5.3 Analysis

In the instances of multiple reported suicidal events, only the first event was kept for analysis. Suicidal event and time until the suicidal event occurred were the primary outcomes. A follow-up period of three years was used. Since secondary data was used, loss to follow-up could only occur if a client died by causes other than death by suicide. A Kaplan-Meier survival analysis was conducted. Additionally, a log rank test of significance was conducted to determine if there was a significant difference between the survival distributions, and Cox regression was also conducted to determine if there were any predictors of a suicidal event occurring. Predictor variables tested were gender, race, psychiatric diagnosis, and type of suicidal event.

4.6 Study V

4.6.1 Group Concept Mapping

Study V used a mixed-methods approach called Group Concept Mapping (GCM) to identify trust-building techniques used to develop strong therapeutic alliances between at-risk adolescents receiving BMHS in the community and their clinicians. GCM uses advanced statistical techniques to analyze qualitative data: Non-metric multidimensional scaling and hierarchical cluster analyses are used to analyze

participants' responses to what is called a *focus prompt*. From these analyses of the participant response data, the procedure then produces a point map and cluster map to create a visual representation of the themes that emerged from the data. Focus prompts are open-ended statements that are developed by the research team to elicit participants' ideas on a specific research topic during what is known as a *brainstorming session*. Good focus prompts are brief and avoid using a question format. The focus prompt for **Study V** was "*A therapeutic relationship between staff and youth that is built on trust should include…*" During the brainstorming session, participants generate as many ideas as they can to complete the focus prompt. After the brainstorming session, participants then complete the phases of *sorting* and *rating*. During the sorting phase, participants sort all the ideas that were generated during the brainstorming session into *piles*, or groups, according to how they perceive similarities and themes among the ideas. Once sorting is completed, participants then rate ideas according to importance and experience. For rating importance and experience in **Study V**, a 4-point Likert scale was used, with 1 being "Relatively Unimportant" for importance or "I never see evidence of this idea" for experience, and 4 being "Very/Extremely Important" for importance or "I always/every day see evidence of this idea" for experience. From these data, a pattern match graph and go-zone plot are created. Participants do not have to complete all three of the GCM activities. See Figure 4 for an overview of the GCM data collection process.

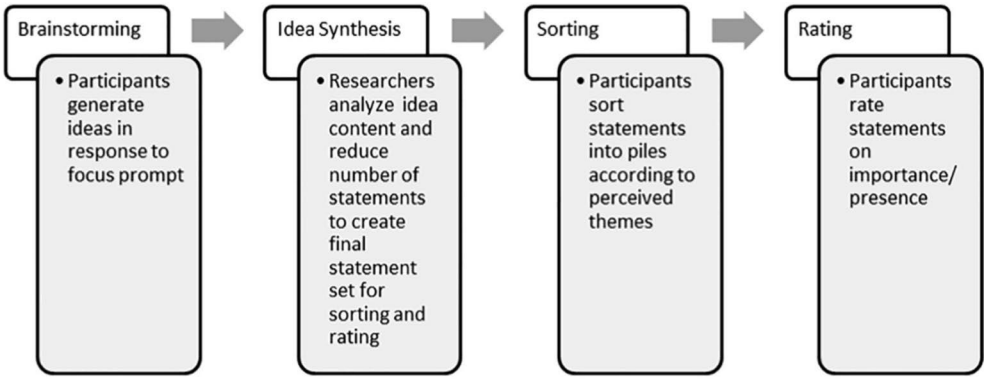

Figure 4. GCM Data Collection Process.

4.6.2 Participants

In **Study V**, a total of 58 unique individuals participated in the various GCM activities. Participants were purposively selected from a parallel quantitative study examining the effectiveness and feasibility of a mobile application of a relationship-building tool. Participants were selected based on the extent to which they were providing

direct care to youth or had provided direct care to youth in the past. The brainstorming activity had the most participants (n=50), with participant rates dropping in the subsequent activities of sorting (n=30), rating importance (n=39), and rating experience (n=32). Participants were predominantly female (71%) and White (n=80%). The predominance of female participants reflects the demographics of professionals in the behavioral and mental health field, which are predominantly female (Smith, 2023). The average age of participants was 41.7 years, with a range of 24 years to 68 years.

4.6.3 Analysis

All data collection and analyses were done using the proprietary GCM software, groupwisdom™ (Concept Systems, 2021). The software also created the point map and cluster map, as well as the pattern match graph and go-zone plot. The cluster solution map is generated from the initial point map, which uses multidimensional scaling to produce a visual representation of how statements were sorted. The points are placed on the map according to the statements' similarity in meaning (Kane & Rosas, 2018). To create the cluster solution map, hierarchical cluster analysis is applied to the output of the point map. Many cluster iterations can be produced from the initial point map; the researchers determine how many clusters will be in the final cluster map by triangulation of the hierarchical cluster analysis values, qualitative data, and the focus of the project (Kane & Rosas, 2018).

Bridging values of the statements are also examined as part of the analysis of the cluster map. Bridging values aid with the interpretation of what content is associated with each cluster on the map. Bridging values range from zero to one. Lower bridging values are considered anchors, which indicate that these statements are more representative of the meaning of that particular area on the map. Higher bridging values indicate these statements serve as bridges to other areas on the map (Kane & Rosas, 2018).

Additionally, from the rating phase, a pattern match graph and go-zone plot were generated. The go-zone plot, which is akin to a scatterplot, visually represents the placement of each statement on the horizontal axis (importance) and vertical axis (experience). Go-zones are used to identify gaps in participant ratings. For example, in this study, gaps are discrepancies in how important a statement was rated versus how often it is experienced in programs.

5 Results

5.1 Study I

Study I found that an SOP around how to deal with external researchers soliciting a CBBMHCO for access to their clientele for participant recruitment and an accompanying research review committee at the CBBMHCO helped protect clientele from potentially having data collected on them by an electronic healthcare device without proper safeguards in place to guard their data and their privacy. The results of this case study helped validate the importance of CBBMHCOs having standardized protocols and a dedicated team of research professionals on staff in order to ensure vulnerable individuals are adequately protected from potential data privacy violations.

5.2 Study II

Study II found that the prevalence of suicidality (suicidal ideation and/or suicide attempt) was almost 40% among at-risk adolescents. The prevalence of suicidal ideation was 32.5%, and the prevalence of suicide attempt was 25.5%. **Study II** also found that many of the well-established risk factors of suicidality among the general adolescent population were also found to be significant risk factors, or correlates, for suicidality among at-risk adolescents. These include gender, psychiatric diagnosis, history of physical abuse, history of sexual abuse, bullying victimization, domestic violence, loss of loved one, impulsivity, and anger. Race was not found to be correlated with suicidality among at-risk adolescents. Loss of loved one, however, was not significantly associated with suicidality in some of the models: it was not significantly associated with suicidality in the model that included suicidal ideation and suicide attempt, and the model that only included suicide attempt. History of sexual abuse was the most significantly associated with suicidality across all four of the models ($P = 0.001$). **Study II** found that history of sexual abuse was also a significant predictor of suicidality in all four models. Impulsivity was a significant predictor of suicide attempt only. Table 2 shows the results from the bivariate analyses. And Table 3 shows the results from the multivariate analyses.

Table 2. Results from Bivariate Analyses, From Study II.

Results from bivariate analyses: suicidal behavior among an at risk population of adolescents receiving community-based mental health services

	SB(SI OR SA)			SB(SI AND SA)			SI			SA		
Variable	SB(%)	No SB(%)	p	SB(%)	No SB(%)	p	SI(%)	No SI(%)	p	SA (%)	No SA (%)	p
Sex (Male)	36.4	55.3	.002	33.3	51.3	.020	38.3	52.8	.021	31.3	51.5	.004
Race (White)	64.2	67.8	.534	66.0	66.5	.943	63.4	67.9	.457	66.7	65.8	.900
Diagnosis (Internalizing)	56.4	31.3	.000	58.8	37.0	.014	55.3	33.8	.002	59.7	34.7	.002
Physical Abuse	48.2	29.1	.001	62.7	30.7	.000	48.9	30.3	.002	58.2	28.6	.000
Sexual Abuse	41.8	15.3	.000	56.9	18.6	.000	43.6	16.6	.000	50.7	16.5	.000
Bullying Victimization	51.4	32.0	.001	54.9	36.0	.012	52.1	33.2	.002	53.0	33.8	.006
Domestic Violence	53.6	35.2	.002	64.7	37.4	.000	53.2	36.9	.009	62.7	35.2	.000
Loss of Loved One	58.7	41.0	.004	58.8	45.3	.080	60.6	41.5	.002	56.1	43.6	.079
Impulsivity	44.9	28.7	.006	56.9	30.0	.000	45.7	29.6	.009	53.0	27.4	.000
Anger	66.4	51.8	.018	76.5	53.2	.002	67.4	52.5	.019	72.7	50.8	.002

SB = Suicidal behavior SI = Suicide ideation SA = Suicide attempt P= P-value

Table 3. Results from Multivariate Analyses, From Study II

Results from multivariate analyses: suicidal behavior among an at risk population of adolescents receiving community-based mental health services

	SB(SI OR SA)			SB(SI AND SA)			SI			SA		
Variable	OR	95% CI	p-Value	OR	95% CI	p-Value	OR	95% CI	p-Value	OR	95% CI	p-Value
Sex (Male)	1.66	0.95-2.90	.073	1.71	0.81-3.62	.155	1.36	0.76-2.41	.297	1.92	0.97-3.80	.061
Diagnosis (Internalizing)	0.95	0.67-1.36	.788	1.05	0.65-1.70	.844	0.97	0.67-1.40	.862	1.09	0.71-1.68	.691
Physical Abuse	1.30	0.71-2.37	.394	2.01	0.95-4.26	.067	1.29	0.70-2.39	.418	1.82	0.91-3.64	.093
Sexual Abuse	2.52	1.33-4.78	.004	3.12	1.48-6.56	.003	2.79	1.47-5.30	.002	2.43	1.19-4.96	.015
Bullying Victimization	1.48	0.85-2.55	.165	1.08	0.53-2.22	.827	1.45	0.82-2.55	.196	1.31	0.69-2.49	.414
Domestic Violence	1.25	0.71-2.20	.445	1.62	0.78-3.35	.194	1.16	0.65-2.08	.619	1.69	0.88-3.27	.118
Loss of Loved One	1.63	0.93-2.82	.085	1.17	0.57-2.40	.659	1.73	0.98-3.05	.060	n/a	n/a	n/a
Impulsivity	1.50	0.80-2.79	.208	2.01	0.93-4.34	.075	1.42	0.75-2.68	.286	2.16	1.05-4.43	.036
Anger	1.22	0.66-2.56	.256	1.76	0.75-4.10	.191	1.25	0.66-2.37	.487	1.48	0.70-3.11	.307

SB = Suicidal behavior SI = Suicide ideation SA = Suicide attempt P= P-value

5.3 Study III

Study III found that though Facebook is assuming a role of a public health entity by implementing suicide detection, the social media platform is not abiding by certain moral and ethical edicts that are established in the public health and medical field. By collecting data on user's mental health and then acting on that data, Facebook is

effectively providing a health care intervention. Furthermore, user data is being collected without consent, which is a gross violation of patient rights. Additionally, by collecting data and testing an algorithm that has not been validated, the social media platform is also engaging in a large-scale research study. Again, user data is being collected without consent, which also violates human subjects research ethics

5.4 Study IV

Study IV found that the average time from suicidality risk screen at intake to suicidal event was 185 days (6.2 months). The log rank test of significance was significant ($P = 0.001$), meaning that the survival distributions between the two groups—youth who screen positive for suicidality risk at intake and youth who screened negative for suicidality risk at intake—was significantly different: youth who screened negative for suicidality risk at intake had a longer time until reported suicidal event than youth who screened positive for suicidality risk at intake. Figure 5 shows the Kaplan-Meier curve. Additionally, of the predictor variables tested, only gender (female) was found to be a significant predictor of a suicidal event occurring.

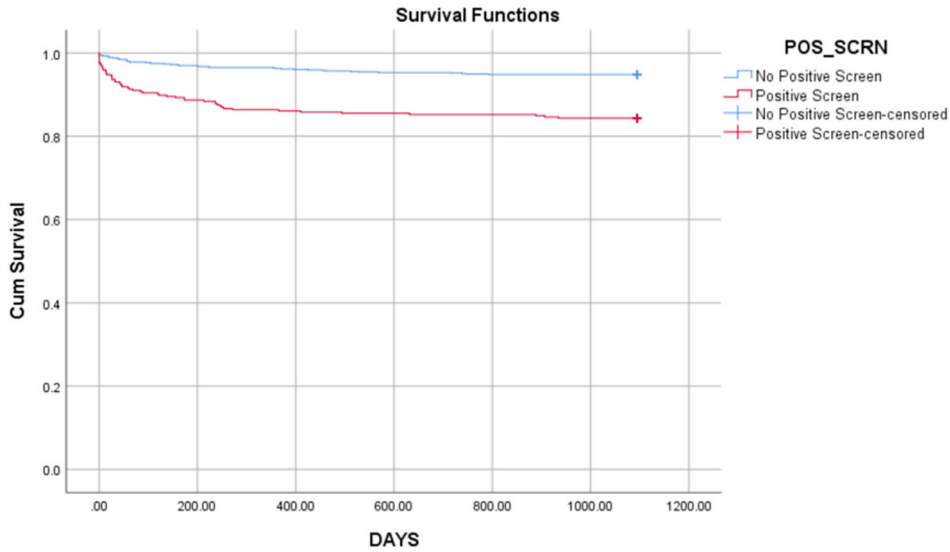

Figure 5. Kaplan-Meier Curve of Time Until Suicidal Incident.

5.5 Study V

Study V found that clinicians identified five trust-building techniques that help to develop strong therapeutic relationships between at-risk adolescents: 1) Ecosystemic Approach, 2) Strong Working Alliance, 3) Professionalism, 4) Warmth & Support,

and 5) Open Communication. Figure 6 shows the cluster solution map that the analysis produced, and Table 4 provides examples of statements associated with each technique, along with bridging values.

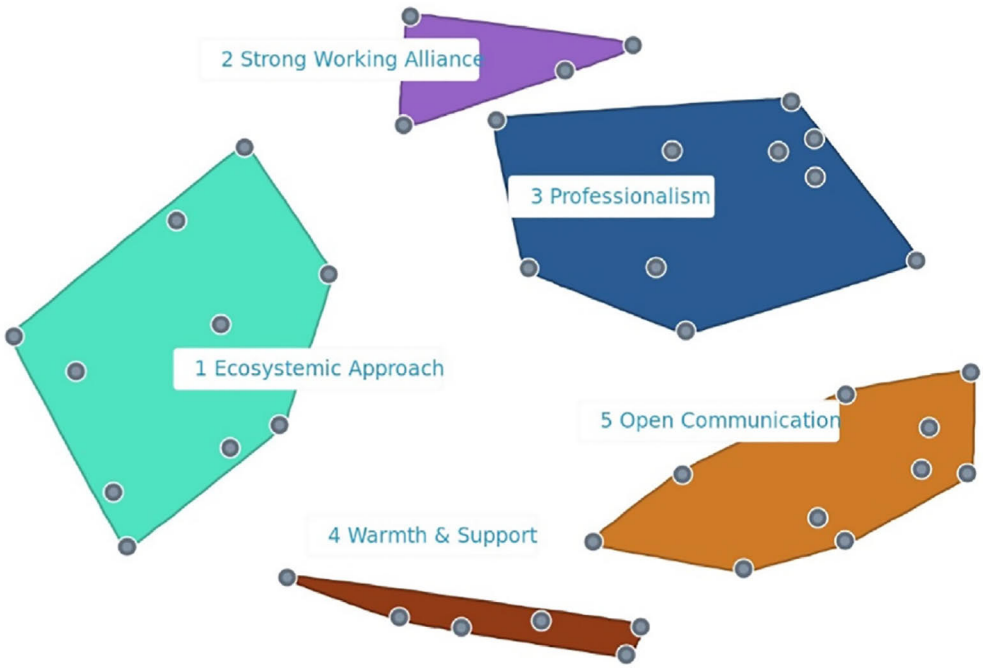

Figure 6. Cluster Solution Map.

Table 4. Statement Examples by Cluster Name and Bridging Value.

STATEMENT	CLUSTER NAME	BRIDGING VALUE
8. Having respect of the unique cultural experience of youth/family	Ecosystemic Approach	0.200
17. Agreed upon areas to work toward together	Strong Working Alliance	0.187
24. Providing constructive feedback	Professionalism	0.000
6. A genuine concern for the well-being of the youth	Warmth & Support	0.166
40. Reflection & acknowledgement to youth	Open Communication	0.008

The point map for this study was generated after 10 iterations and had a stress value of 0.33. The stress value can be likened to a goodness of fit measure for the data, and the lower the stress value, the more accurately the data represent the relationships between data points. There is no predetermined value of an optimal stress value for a project, but for most GCM projects, a final map with a stress value

between 0.10 and 0.35 is considered interpretable (Kane & Rosas, 2018). In **Study V**, the statement with the lowest bridging value (0) was statement 24 "Providing constructive feedback (Cluster 3)," and the statement with the highest bridging value (1) was statement 10, "A safe place where they can come to be honest with themselves (Cluster 1)."

For this study, a relative pattern match compared the ratings of importance and experience for the identified clusters. According to the pattern match graph, statements in Cluster 4, *Warmth & Support*, were rated as the most important and the most experienced in programs, while statements in Cluster 2, *Strong Working Alliance*, were rated as the least important and the least experienced in programs. See Figure 7 for the pattern match graph.

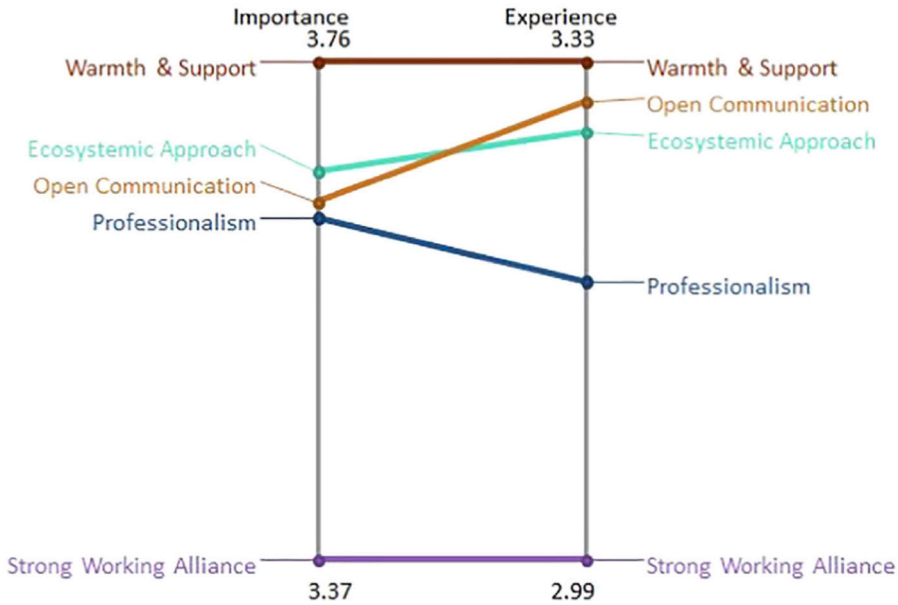

Figure 7. Relative Pattern Match.

Figure 8 shows the Go-Zone plot that was generated from the analysis, and Table 5 provides examples of statements that were rated high on importance but were less likely to be experienced in the programs.

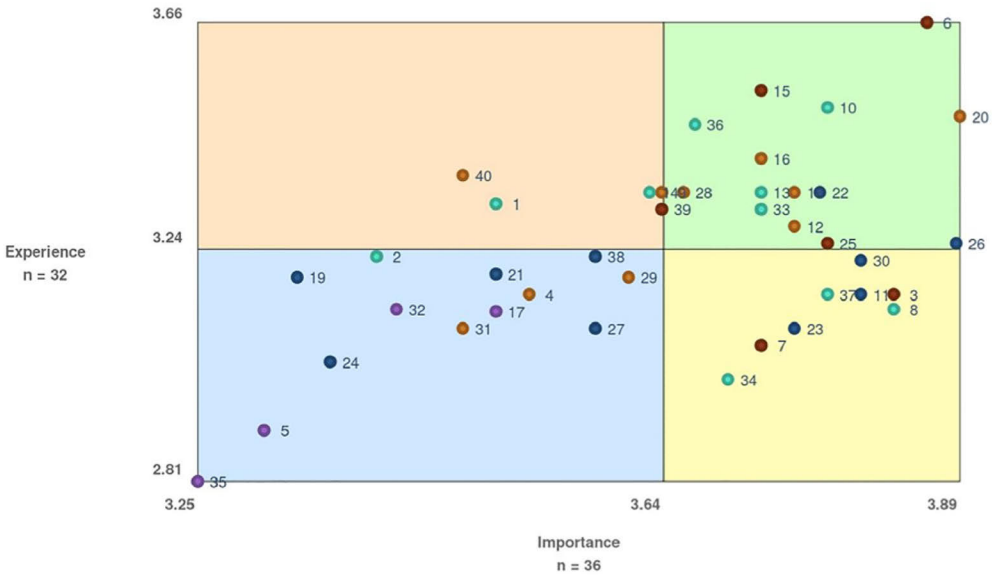

Figure 8. Go-Zone, All Clusters.

Table 5. Go-Zone Statements, High Importance/Low Experience.

STATEMENT	MEAN IMPORTANCE RATING	MEAN EXPERIENCE RATING
8. Having respect of the unique cultural experience of the youth/family	3.83	3.13
3. A child should feel like they are able to be open and honest and be able to trust that they will receive the help and support they need	3.83	3.16
11. Setting clear boundaries	3.81	3.16
30. Being accountable for your own behavior	3.81	3.22
37. Taking the time to understand what happened to the youth/family and how those experiences have shaped their lives	3.78	3.16
23. Being consistent throughout treatment	3.75	3.09
7. Being nonjudgmental. The youth should not feel like they will be criticized for anything they are saying	3.72	3.06
34. Making an effort to repair a damaged working relationship or resolving conflicts	3.69	3.00

6 Discussion

6.1 Study I

Study I, using case study methodology, examined the protocols a CBBMHCO has in place to protect clients from possible exploitation by external research entities and institutions. It is commendable that this CBBMHCO has such protocols in place, and the case study presented an example in which, if there had not been an internal research review committee to gatekeep access to clients as research participants, the clients' privacy might have been violated through the data collection procedures of a proposed study by an external researcher.

With the growing interest in community-based participatory research and using community-based samples to conduct research rather than university-based samples, it is imperative that CBBMHCOs have the requisite protocols to protect the rights and privacy of their clients should they be approached by external research entities to participate in research studies. However, the case study presented in **Study I** is likely the exception to the rule, as many CBBMHCOs do not have the infrastructure to support internal research review committees, either due to lack of financial resources or lack of trained research staff. This lack of capability to conduct internal research reviews of external research proposals is concerning, especially within the context of electronic data collection platforms and medical devices that collect user data.

One solution to this concern could be the establishment of a nation-wide consortium of CBBMHCOs that is led by evaluation or research professionals that are employed by CBBMHCOs, with the focus of protecting clients from external research entities. For CBBMHCOs that do not have evaluation or research professionals in their employ, members of the consortium with this expertise could be called upon to review any research studies that had been presented to them by external researchers. Perhaps the consortium could even develop an SOP for its members around guidance for what to do when approached by external researchers to access clients for study recruitment purposes.

6.1.1 Strengths and Limitations

A strength of a case study is its ability to allow for in-depth exploration of a unique or rare phenomena. In the instance of **Study I**, case study methodology provided the opportunity to examine how individuals receiving behavioral and mental health services in the community were protected from potential risk involved with participating in a research study being conducted by an external research institution. Through the application of case study methodology, the importance of having standardized procedures in place to protect individuals receiving behavioral and mental health services in the community from research subjects' rights violation was elucidated. The main limitations of case study methodology are the lack of generalizability due to the small sample size and the inability to replicate the study. There is also the potential for researcher bias to be introduced when using case study methodology.

6.2 Study II

Upon receiving approval from the internal research review committee at the CBBMHCO featured in Study I, **Study II** proceeded to use electronic health record data to examine correlates and predictors of suicidality among an at-risk population of adolescents receiving behavioral and mental health services in the community. The analysis revealed that the prevalence of suicidality among at-risk adolescents is rather high, with 40% of the adolescents in the study reporting some form of suicidality (suicidal ideation and/or suicide attempt). Around a third (32.5%) of the adolescents reported suicidal ideation, which is double the prevalence of suicidal ideation among the general adolescent population, and about one quarter (25.5%) of the adolescents reported a suicide attempt, which is triple the prevalence of suicide attempts among the general adolescent population (Nock et al., 2013) This elevated prevalence of suicidality among at-risk adolescents provides further support for the necessity of conducting more research with this sub-population in order to establish a better understanding of their suicidality risk profile.

Though many of the previously-established risk factors for suicidality among the general adolescent population were found to be risk factors for suicidality in **Study II** as well, the most notable finding was the strong predictive quality that sexual abuse had across all four statistical models that were tested. Ongoing research on adolescent suicidality has consistently demonstrated a strong correlation between sexual abuse and increased probability of suicidality (Soylu & Alpaslan, 2013; Soylu et al., 2022). While there are limitations inherent with using secondary data extracted from electronic health record systems, the findings of **Study II** should be given due consideration when treating this sub-population of adolescents. Screening at intake for sexual abuse would be advisable, as well as routine screening for sexual abuse thereafter. Doing so may help prevent suicidal behavior in the future. **Study II**

therefore provides valuable research-to-practice information that could be used to inform and improve clinical practice at CBBMHCOs.

6.2.1 Strengths and Limitations

One strength of this study includes using a community sample, as opposed to a sample derived from the university setting or inpatient psychiatric hospitals. By using a community sample, it is more likely that the results are representative of reality and the population studied, as opposed to the more "sterile" or controlled nature of university samples. Additionally, this study provides important descriptive information on the understudied topic of suicidality among adolescents receiving behavioral and mental health services in the community. The results from this study help begin to fill in this concerning gap in the literature and can be used to guide additional research on the topic. Limitations include the cross-sectional nature of the study design: cross-sectional studies only provide a snapshot in time of phenomena, and, as such, cause-and-effect cannot be established, nor can patterns over time be studied. An additional limitation is the use of secondary data from an EHR system. Researchers do not have control over what data are collected using an EHR system, as the data of interest are defined by the organization using the EHR system. Similarly, researchers also do not have control over the way in which the data are collected using the EHR system; more likely than not, the data were collected by individuals who are not trained in research and data collection practices.

6.3 Study III

Study III concluded that there are concerning legal, ethical, and wider implications of the implementation of suicide detection systems embedded within social media platforms, with particular emphasis on Facebook's suicide detection algorithm. Legally, if Facebook's collection and use of user data to prevent suicide is considered a form of health care or health intervention, the user data should be protected under the Health Insurance Portability and Accountability Act (HIPAA). Currently, user data collected and used to determine suicide risk by Facebook is not protected under HIPAA. Furthermore, it seems that Facebook users are largely unaware of the platform's suicide risk detection strategy (Burr et al., 2019). If this is indeed the case, then that would imply that users are not fully informed on what they are consenting to under Facebook's data usage terms and conditions. Facebook users should be provided information on the suicide prevention goals of the platform, as well as information regarding how the suicide risk detection algorithm works, and then users should provide consent for their data to be used in such a manner. The failure to

obtain such consent presents privacy risks and can result in exposure of sensitive personal data and subsequent harm from such data breaches.

Ethically, one could argue that by collecting data on individuals and using that data to test a suicide detection algorithm that Facebook is engaging in large-scale research study. It would therefore follow that Facebook should be held to the same ethical standards and protocols that professional researchers are held to and expected to follow when conducting research studies with human subjects. The ethical standards for protected the rights of human subjects is outlined in the Belmont Report (1979), and currently Facebook is not adhering to these standards. Additionally, not only is Facebook testing a suicide risk detection algorithm, but if suicide risk is detected by the algorithm, subsequent human response and intervention takes place in the form of a law enforcement official escorting the individual identified at risk to an inpatient mental health hospital for psychiatric evaluation. The problem with this type of intervention, however, lies in the fallibility of the algorithm and the occurrence of false positives. There have been instances of individuals with no history of mental illness or suicidality being flagged by the algorithm as at risk of suicide and law enforcement officials escorting the individual to the inpatient mental health hospital, per Facebook's risk response protocol, despite the individuals' insistence that doing so was not necessary (Singer, 2019).

Wider implications include the stigma still associated with mental illness, particularly in developing countries. While stigma towards individuals with mental illness has improved in high-income countries, little progress has been made in reducing stigma in low- and middle-income countries (LMIC) (Mascayano et al., 2015). For individuals living in LMICs, suicide risk detection algorithms like Facebook's which involve human response and intervention could lead to dire cultural and societal consequences. Family members of an individual who may be identified as being at risk of suicide could ostracize the individual with mental illness. This is concerning given that social isolation often exacerbates symptoms of mental illness, including suicidality. Within this cultural context, suicide risk detection algorithms could end up doing more harm than good.

One final concern about Facebook's suicide risk detection algorithm is the potential for false positives and the harmful effects these false positives can have on the individuals who experience them. Particularly in countries where suicidal behavior is criminalized, a false detection of suicide risk could have life-altering legal and societal consequences.

6.3.1 Strengths and Limitations

A strength of this study includes its cross-disciplinary approach to critically examining the emerging and continually-developing trend of using suicide risk detection

algorithms embedded within social media platforms. By including experts in a variety of academic disciplines, the issue was examined from different perspectives, which generated a robust, comprehensive analysis of the issue and accompanying conclusions. This study provides a theoretical foundation that can be used to inform future research on the topic of suicide risk detection algorithms embedded in social media platforms. Not using any formal, quantitative analysis is a limitation of the study.

6.4 Study IV

Study IV provides a starting point for further investigating temporal patterns in suicidality among at-risk adolescents receiving BMHS in the community, as well as potential implications for clinical practice in the community setting. There has been no other research conducted on temporal patterns of suicidality among at-risk adolescents receiving behavioral and mental health services in the community that investigates time from suicidality risk screening at intake to suicidal event. Therefore, the findings from this study are somewhat unique and unprecedented. Indeed, there are only a handful of survival analysis studies that have been conducted on adolescent suicidality, which highlights the unfortunate reality that compared to adult suicidality, adolescent suicidality is under-researched, (Franklin et al., 2017).The extant research on temporal patterns of suicidality among adolescents does not use a study population of at-risk adolescents receiving community-based behavioral and mental health services, and examines psychiatric phenomena like risk of developing suicidality from early childhood to young adulthood (Wilcox & Anthony, 2004), time to suicide attempts post-psychiatric hospitalization for suicidality (King et al., 2010), time from exposure to traumatic event to the manifestation of suicidality (Gomez et al., 2017), and odds of developing suicidality given a prior chronic medication condition (Dean-Boucher et al., 2020). It should also be noted that there have been very little recent investigations of temporal patterns of suicidality among adolescents within the past decade.

Study IV's findings in regards to the average number of days from time of suicidality risk screen to first suicidal event can be used to guide clinical practice at CBBMHCOs with the hopes of preventing suicide attempts or a death by suicide. Since the average time from suicidality risk screen to reported suicidal event was around 6 months, it might be suggested to re-screen for suicidality at 3 or 4 months into services. By doing so, if suicidality risk has changed since intake, it will be caught well-before the 6-month mark and targeted suicidality interventions can be utilized with clients whose suicidality risk may have increased since initial screening at intake.

One recommendation is that the approach of clinical suicidology be used with at-risk adolescents receiving services at CBBMHCOs. This treatment approach targets suicidality as the point of intervention, rather than more traditional approaches to addressing suicidality, which focus on the accompanying psychiatric disorders (i.e. major depression, anxiety disorders, etc.) (Jobes et al., 2015). The finding of female gender being a significant predictor of a suicidal event occurring can also be used to guide clinical practice by placing particular attention on monitoring the suicidality of female at-risk adolescents receiving BMHS. Other research has consistently shown females being at increased risk of suicidality compared to males (Franklin et al., 2017), which further justifies the recommendation to focus clinical resources on female clients at CBBMHCOs. Another opportunity to help female at-risk adolescents struggling with suicidality could be to involve them in the development of novel gender-specific suicide prevention programs.

6.4.1 Strengths and Limitations

A strength of this study includes using a community sample to investigate temporal patterns of suicidality among adolescents receiving BMHS in the community. As previously discussed, community samples may be more representative of reality than university samples. The use of a survival analysis is another strength, as it allows for a better understanding of patterns in time of an event, as opposed to analyses that only examine correlations or prevalence of certain phenomena. Again, as with **Study II**, a limitation of **Study IV** is the use of secondary data from an EHR system. As previously described, the researcher does not have control over what data are collected in the EHR system; data of interest are determined by the senior leadership of the organization using the EHR system. As such, variables that would have been of interest to the researcher and included in the data analysis were unavailable for study (i.e. history of suicidal thoughts and behaviors (STBs), psychotropic medication use, etc.).

6.5 Study V

Study V offers guidance on how to best develop a strong therapeutic alliance based on trust between at-risk adolescents receiving BMHS in the community and their treating clinicians. Having a strong therapeutic alliance based on trust is arguably the most important predictor of successful treatment outcomes (Tschuschke et al., 2020). This is particularly important for clinicians working with at-risk adolescents. As this thesis has shown, suicidality risk is elevated among this sub-population of adolescents, making it imperative that the treatment being provided is as effective as possible. The five-factor model of essential trust building techniques identified in **Study**

V can be used by clinicians providing BMHS to at-risk adolescents to bolster the therapeutic alliance with the clients they serve, thereby making it more likely that treatment is effective at attenuating suicidality and preventing death by suicide.

The factor of Warmth and Support may be especially important when providing treatment to at-risk adolescents. As the literature has shown, at-risk adolescents have been exposed to negative life experiences, such as abuse and neglect perpetrated by the adults in their lives. Such maltreatment may result in difficulty trusting other adults (Masih, 2018), which could lead to disengagement in treatment. It is therefore important that clinicians working with at-risk adolescents create a therapeutic atmosphere characterized by safety and trust. Clinicians who behave in a warm and supportive manner may more likely engender trust in the youth they are working with, in contrast to clinicians who are cold, standoffish, and judgmental. Indeed, research has demonstrated the importance of a humanistic attitude and approach to the integrity and effectiveness of the clinician-youth dyad (Rogers, 1951; De Boer & Coady, 2006).

6.5.1 Strengths and Limitations

Strengths of this study include the use of participatory research methods. Participatory research methods include community members in the research process, which makes them more akin to partners in research studies rather than passive participants without a voice in the process. This degree of participation from community members in the research process allows for valuable insight into the research topic that might have otherwise gone undetected if community members were not included in the research process and only the researchers' perspectives were considered. Limitations include the small sample size of the study, even though it was well-within the recommended minimum sample size of a GCM study (10-12 participants) (Jackson & Trochim, 2002). It was, however, smaller than other GCM studies, and therefore possibly not the ideal sample size for a GCM study. Another limitation includes that there was participant dropout in each of the concept mapping phases.

6.6 Overall Strengths and Limitations

A major strength of this thesis lies in its use of a variety of research methods to investigate the complicated and nuanced issue of suicidality among at-risk adolescents receiving community-based behavioral and mental health services. Using a blend of qualitative and quantitative research methods allows for a more comprehensive, holistic understanding of the research topic being investigated. Research experts have even suggested that quantitative and qualitative methods should be used in concert with one other, as doing so has a complementary effect, each method

compensating for the other's weaknesses (Kelle, 2008). Qualitative data help add contextual richness to quantitative data, while quantitative data provide a robust, objective understanding of phenomena and trends.

As previously mentioned, limitations include the use of EHR systems data for **Study II** and **Study IV**. Due to the secondary nature of EHR systems data, the researcher does not have control over the variables included in the studies. This limits what can be investigated, and in the case of **Study II** and **Study IV**, there are other variables that could have been investigated had the researcher had complete control over the data collected. Additionally, with EHR systems data, there may be concerns over the quality of the data collected given that it is incumbent upon program staff to enter data, not researchers trained in data collection. Other researchers have noted the possible limitations of EHR data (Robst et al., 2011).

7 Summary/Conclusions

Death by suicide is the second leading cause of death among adolescents in the United States, making it a significant public health concern. Suicidality, the range of suicidal behaviors that precede death by suicide, is more prevalent in at-risk adolescents than the general adolescent population, making this sub-population of adolescents at increased risk of death by suicide. While much research has been done on risk factors for suicidality among the general adolescent population, there is a dearth of suicidality research on at-risk adolescents, and what little research that has been done on suicidality among at-risk adolescents is of dubious quality. This gap in the literature means that a comprehensive suicidality risk profile for at-risk adolescents does not exist. This is concerning given at-risk adolescents' increased risk of suicidality due to the battery of traumatic experiences they have likely been exposed to in childhood and continuing into adolescence. Without a complete suicidality risk profile, proper treatment maybe be more difficult to provide to this sub-population of adolescents.

This thesis sought to address this gap in the literature by conducting studies of correlates and predictors of suicidality among at-risk adolescents receiving BMHS in the community, as well as investigating temporal patterns of suicidal incidents. Additionally, research on how to build strong therapeutic alliances between at-risk adolescents receiving BMHS in the community and their treating clinicians was conducted. In addition to adding to the body of empirical research on suicidality among at-risk adolescents, it is hoped that the results from this thesis will be used to inform and guide clinical practice at CBBMHCOs.

The results from **Study II** revealed that sexual abuse is a significant predictor of suicidality among at-risk adolescents, and **Study IV** showed that female gender was a significant predictor of a suicidal event occurring. Taken together, it would be advisable for CBBMHCOs to implement SOPs related to suicidality risk screening, with particular focus on females, as well as those whom have experienced sexual abuse. Given the elevated prevalence of suicidality among at-risk adolescents receiving services at CBBMHCOs, it also might be advisable for these organizations to adopt the practice of clinical suicidology. Clinical suicidology is a relatively new clinical approach that targets suicidality during treatment rather than the mental

disorders that typically co-occur with suicidality, such as depressive disorders and anxiety disorders. This clinical approach places emphasis on suicidality risk assessment, treatments intended to address suicidality risk, and formal training in suicidality-specific interventions (Jobes et al., 2015). Implementing clinical suicidology as the treatment approach for at-risk adolescents receiving services at CBBMHCOs could have the potential to reduce the prevalence of suicidality, as well as prevent suicidal events from occurring, including death by suicide.

Using the approach of clinical suicidology in concert with the trust-building techniques identified in **Study V** will help ensure that at-risk adolescents who are being treated at CBBMHCOs are receiving the best possible treatment. Empirically-supported treatments and interventions cannot stand on their own: a strong therapeutic alliance is needed to serve as the base and driver of effective treatment. Trust is at the root of a strong therapeutic alliance between clinicians and youth, and the results of **Study V** provide clinicians with a blueprint for building trust with their clients. It is even more important to foster trust with at-risk adolescents given that many have been involved in systems (i.e. juvenile justice, child welfare) that are notorious for damaging youth's trust in adult providers.

It is hoped that this thesis will encourage more research to be conducted on at-risk adolescents receiving services at CBBMHCOs. While this thesis has provided a starting point for such research, there is much more to be done. At-risk adolescents have unique life experiences that distinguish them from the general adolescent population—most notably exposure to traumatic events early in life—which requires extensive research to understand the behavioral and mental health needs of this subpopulation and to develop a comprehensive suicidality risk profile. By doing so, the behavioral and mental health field will be better equipped to provide effective services and treatment to at-risk adolescents.

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Karen Lynn Celedonia

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