THE FACTORS ASSOCIATED WITH SUICIDALITY AMONG CANADIAN YOUTH: A CROSS-SECTIONAL SECONDARY ANALYSIS

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ABSTRACT

The focus of this thesis was to examine the association between vulnerable youth and suicidality. This was done by conducting a secondary analysis on youth aged 15 to 29. A secondary data analysis took place utilizing the Statistics Canada 2022 Mental Health and Access to Care Survey for two separate papers. In the first paper exposure to childhood maltreatment was examined as an exposure variable for the outcome suicidality among the age group 18 to 29. Results indicated that those exposed to childhood maltreatment were more likely to experience suicidality than those not exposed. Additionally, the odds of suicidality increased with the number of maltreatment types experienced, suggesting a potential dose-response relationship. This association showed evidence for being partially mediated by mental health conditions, specifically meeting diagnostic criteria for depression or anxiety. In the second paper, minority status was created as an exposure variable for the outcome suicidality by combining racialized minorities (including Indigenous groups), and sexual identity minorities for the age group 15 to 24. These results showed minorities were more likely to experience suicidality compared to non-minority youth. This association appeared to be partially mediated by childhood maltreatment, which consisted of experiencing any form of maltreatment in the past. Findings from both studies suggest that vulnerable youth are more likely to experience suicidality, placing them at an increased risk for negative health outcomes. This emphasizes the importance of reducing systemic inequalities and developing context specific interventions to support these groups of youth. Policy makers, governments, and the community should aim to use proactive measures for prevention rather than implementing more crisis interventions in the future.

CONTRIBUTIONS OF AUTHORS

The author conducted a secondary analysis and was solely responsible for formulating the research questions, study design, data analysis, interpretation of results, and writing of the entire thesis. Academic supervision and feedback were provided by Dr. James Sanders and the thesis committee.

ETHICS STATEMENT

The work described in this thesis received research ethics approval from the University of Alberta Research Ethics Board 2 under the following applications:

Title	Number	Date
Canadian Minority Youth Suicide	Pro00142299	May 14, 2025

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CCHS	Canadian Community Health Survey
LGBTQ+	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, other (+)
ACE	Adverse Childhood Experiences
MHACS	Mental Health and Access to Care Survey
APA	American Psychological Association
C-SSRS	Columbia Suicide Severity Rating Scale
WHO	World Health Organization
CIDI-SF	Composite International Diagnostic Interview-Short Form
DSM	Diagnostic Statistical Manual
DAG	Directed Acyclic Graph
IPTS	Interpersonal Theory of Suicide
3ST	Three-Step Theory
CDC	Centers for Disease Control and Prevention
PTSD	Post-Traumatic Stress Disorder
SDQ	Strengths and Difficulties Questionnaire

CHAPTER 1: INTRODUCTION

1.1 Background

Youth mental health has been emerging as a global public health concern.[1] Suicide is a leading cause of death among adolescents and young adults, and despite the growing awareness of youth mental health, suicide rates among young people have remained high or even increased.[2-4] Globally, over 700,000 individuals die by suicide each year, and many more experience suicidal ideation or engage in suicidal behaviours.[2] Suicide during youth can have lasting effects on families, friends, and communities. Understanding the underlying factors that contribute to suicidality in youth is essential for developing effective prevention strategies.

According to national surveys, the prevalence of suicidal ideation and suicide attempts remains concerning. In Canada, the 2012 Canadian Community Health Survey (CCHS) reported that approximately 3.3% of Canadians aged 15 and older reported suicidal thoughts in the past year.[4] In the United States, over 12 million individuals reported serious thoughts of suicide in 2019, and increases in suicidality were observed particularly among those aged 18-25 from 2008 to 2019.[5] In Canada, there is a lack of research aimed at identifying group specific factors that contribute to suicidality in youth. For example, there is very limited research examining how suicidality impacts minority youth in Canada, indicating a need for more inclusive and representative studies. Risk factors for suicidality in groups of youth may include psychological factors, or social and environmental contexts, however, a lack of identified group specific factors can inhibit development of targeted interventions.

Minority status, meaning belonging to a racialized group or identifying with a sexuality that is not heterosexual, has shown to be associated with increased risks of suicidality.[6-8] The reasons behind why this is the case may be linked to social adversity or other larger systemic

issues; however, a theory of minority stress has been proposed to explain this disparity.[9-11] The Minority Stress Theory proposes that individuals from marginalized groups experience chronic stressors associated with discrimination, stigma, and social exclusion.[11] These chronic stressors due to minority status are in addition to the common life stressors and challenges of adolescence for minority youth. This could be a reasonable explanation for the increased risk of suicide among this group. For example, LGBTQ+ youth have been found to be several times more likely than their heterosexual peers to experience suicidality which includes suicidal ideation, developing a suicide plan, or making a suicide attempt.[12, 13] Racialized minority youth in particular have been shown to have increased rates of suicidality, despite lower diagnoses of mental health conditions.[7, 14, 15] In Canada, suicide rates among Indigenous peoples, especially youth, are significantly higher than non-Indigenous Canadians.[14] The experiences endured by minority status youth may be unique to these populations, with the acknowledgement that there are diverse experiences based on identities of racialized or sexual minority groups. Therefore, suicide prevention strategies should be targeted to address these particular stressors. Disparities such as the ones minorities face could reflect issues such as access to culturally appropriate care, underreporting due to stigma, or the effects of discrimination.[7, 10, 11, 15]

Another factor that has been explored as a risk factor for suicide is childhood maltreatment. Childhood maltreatment includes neglect, being a witness to domestic abuse, and emotional, physical, and sexual abuse.[16] There has been much research that focuses on Adverse Childhood Experiences (ACEs), and adult retrospective studies. In a Canadian study using a sample of adults it was reported that the odds of attempting suicide was significantly higher for those with a history of ACEs.[17] Similarly in a 13 year-long longitudinal study utilizing a national sample of high school aged youth in the United States, it was found that exposure to ACEs

significantly increased thoughts and attempts of suicide in adulthood.[18] This study also reported that as the number of ACEs increased, the odds of suicidal behaviours increased, indicating a dose response association.[18] As mentioned, ACEs and suicide is a well explored association in the literature. An umbrella review of systematic reviews and meta-analyses revealed that ACEs were consistently associated with suicidality including ideation, plans, and attempts.[19] Another more recent systematic review and meta-analysis examined ACEs and suicide within low- and middle-income countries and reported similar findings with suicidal outcomes being significantly associated with exposure to ACEs.[20]

There is a gap in the literature, especially in the Canadian context, where many studies focus on ACEs rather than being specific to childhood maltreatment, and the research that is available does not often utilize samples of youth. Utilizing samples of youth can provide insight into how more recent experiences of maltreatment influence the association with suicide, as this is an area that remains underexplored in Canada. In the United States there is evidence from youth samples that encounters of maltreatment increased odds of suicidality, and reports of dose response where more maltreatment types experienced was associated with increased odds of suicidality.[21-23] The research that is available in Canada regarding childhood maltreatment and suicidal outcomes has shown that about one third of individuals reported experiencing some form of abuse before the age of 16, and the abuse type may vary based on sex.[16] Another study stated that among people who had experienced suicidal ideation in the past year, a large proportion also reported experiencing a history of childhood abuse.[24] While there are evidently some studies that do focus on childhood maltreatment and suicide, the studies are a bit dated. This data ranges back from 2001 up to 2017.[16, 21-24] It is important to update this information to better understand the current situation of this association as the context in which we live today

has drastically changed from when this data was obtained. Updating these data to reflect the reality of a post-pandemic world and the impact of social media on youth is important. New information can be beneficial to develop evidence-based interventions if needed.

Childhood maltreatment has shown to affect different groups disproportionately. Many studies have reported elevated rates of ACEs among minority groups.[25-31] Minority groups include sexual identity minorities, as well as racial minorities including Indigenous populations. Additionally, some of this research also reported disproportionate rates of suicidality among minority populations based on higher ACE scores or childhood maltreatment.[27, 28] Overall, minorities are more likely to be subject to abuse in childhood, and suicidal outcomes.

Another important factor to consider is the role of mental health conditions when it comes to suicidality in youth. Mental health conditions such as depression and anxiety are strong risk factors for suicidality in all youth.[32] However, these mental health conditions have also shown to disproportionately affect minority groups, similar to what was discussed with childhood maltreatment. Depression and anxiety are often elevated in those belonging to a minority group, especially for those who are sexual identity minorities.[33] Consequently, these individuals have shown to be at an increased risk for suicidal behaviours.[34] For racial minorities, there are less formal diagnoses, and less suicidal ideation documented, but it has been found that suicide attempts are more likely among these groups.[15] This same research states that these numbers might be explained by the lack of access to care available, the cultural stigma, or not knowing how or when to seek mental health services.[34]

Each variable discussed up to this point may be important predictors, moderators, or mediators of an association with a suicidality outcome as described in the evidence above. Being a minority youth or being exposed to childhood maltreatment may be predictors of suicidality,

but more recent research is needed to support past findings or understand these associations within the Canadian context. The potential mediating effect of childhood maltreatment on the pathway from minority status and suicidality should be explored. If individuals from minority groups are at an increased risk of experiencing childhood maltreatment and given that ACEs are well documented precursors to suicide, it seems plausible that childhood maltreatment could lie on the causal pathway. Additional mediating effects that could be explored include meeting the criteria for mental health conditions of depression or anxiety disorders given the evidence of their association with suicidality.[32] The mediating effects of these mental health conditions on the pathway from minority status to suicidality will therefore be explored. Lastly, it is also important to note that childhood maltreatment may lead to the experience of mental health conditions in youth as well. Those that experience maltreatment may develop a mental health condition, or experience the symptoms associated with mental illness, and therefore be subject to having suicidal thoughts or engaging in suicidal behaviours.[16, 35] This mediating effect will also be explored.

Overall, youth suicide is a complex issue that needs to be further examined. There is a lack of studies in Canada that examine group specific risk factors for suicide, or that identify mediating roles of other variables. This thesis aims to contribute a more informed understanding of youth suicidality in Canada by exploring how minority status and childhood maltreatment, both together and separately, affect suicidal outcomes. Gaining an understanding of these topics is important for developing targeted interventions for the protection of young people in this country.

Research Questions

This paper-based thesis will analyze the following research questions:

1. Is the severity of childhood maltreatment associated with a higher likelihood of suicidality among Canadian youth aged 18 to 29?
    a. **Secondary RQ:** Does meeting the criteria for depression or anxiety mediate the association between childhood maltreatment and suicidality?
2. How does the likelihood of suicidality differ between minority status and non-minority status youth aged 15 to 24 in Canada?
    a. **Secondary RQ**: Does the experience of childhood maltreatment mediate the association between minority status and suicidality?
    b. **Secondary RQ**: Does meeting the criteria for depression or anxiety mediate the association between minority status and suicidality?

1.2 Methods

Study Design

A secondary data analysis will take place for this study utilizing the data collected from the 2022 Mental Health and Access to Care Survey (MHACS) by Statistics Canada.[36] This was a repeat of the 2012 Canadian Community Health Survey on Mental Health. The objectives of the MHACS were to assess the mental health status of Canadians, the impact of the COVID-19 pandemic on population health, the access and utilization of mental health services, and the links between mental health and various variables. The survey used a cross-sectional design.[36]

The design for this survey involved consultation of stakeholders from provincial and federal ministries, public and mental health agencies, and academic experts.[36] The content and questions throughout the survey were based on research that identified data gaps, the number of people affected by the issue, impacts on the community, healthcare costs, issues that were priorities for developing programs and policy, as well as content that compared with the previous

2012 survey.[36] Much of the content was previously administered in the 2012 survey and it had gone through qualitative testing (one-on-one interviews) to evaluate respondent reactions, willingness to respond, and overall understanding of the survey. For the present study, the survey variables that will be statistically analyzed include age, gender, visible minority status, Indigenous identity, sexual orientation, childhood experiences, suicidality factors, and the mental health criteria of depression or anxiety.

1.3 Study Setting and Participants

The MHACS was administered in Canada to the target population of those 15 years and over as of March 1, 2022, living in the 10 provinces excluding those living on reserves and other Aboriginal settlements, full-time members of the Canadian Forces, and those living in collective dwellings. The target population was stratified by age group (15-24, 25-44, 45-64, and 65+), by sex (female, male), and by population group (i.e., race) to ensure the sample was representative. This stratification facilitated the oversampling of visible minorities and ensured there were enough respondents within the specific age and sex groups. This was done to allow relevant analyses of these populations. Data was collected using computer-assisted telephone interviews provided by trained interviewers. The interviewer was presented with a question on a computer screen to ask the participant. Based on the participant's answer that is inputted by the interviewer, the computer would present the next relevant question.[36] Data collection took place from March 17, 2022, to July 31, 2022.

For this thesis, only the ages of 15 to 24 and 18 to 29 will be included to gather evidence surrounding youth suicidality. All genders, sexual identities, and population groups will be included for analysis. Ethics approval for this thesis was granted by the Research Ethics Board through the University of Alberta (Study ID: Pro00142299).

1.4 Measures

Suicidality is the outcome variable for this study. The APA dictionary identifies suicidality as a risk of suicide due to suicidal ideation, intent, or a deliberate plan and can also include an attempt.[37]. To assess suicidality mechanisms, the MHACS, includes a range of suicide questions, such as “Did you ever seriously think about taking your own life”, “Did you ever make a plan for attempting suicide”, or “Have you ever attempted suicide or tried to take your own life?” eliciting either a ‘Yes’ or ‘No’ response.[36] Suicide risk is typically assessed by a healthcare professional, often through the use of validated screening tools such as the Columbia Suicide Severity Rating Scale (C-SSRS).[38, 39] As this approach is not feasible in large-scale surveys such as the MHACS, self-report measures are used as an alternative. Although not considered the gold standard, these items have been used in previous national surveys and have gone through testing for factors such as respondent willingness to respond, supporting their use in the present survey.[36] In this thesis suicidality will be assessed by the self-report of any past suicidality, and analyzed as a dichotomous outcome variable (0 = none, 1 = suicidality).

Childhood maltreatment will be analyzed as an exposure variable, and a potential mediating variable for this thesis. Childhood maltreatment is defined by the World Health Organization (WHO) as an act that promotes damage to the health, development, or dignity of a child.[40] Childhood maltreatment has five categories including physical, sexual, and emotional abuse, as well as neglect, and exploration.[40] Diagnosis of childhood maltreatment would involve identification by a healthcare professional. For this thesis, experiences of childhood maltreatment will be self-reported experiences of witnessing domestic abuse, or encountering physical, or sexual abuse. Childhood maltreatment will be assessed by utilizing the childhood experiences section in the MHACS which asks the participants questions about abusive encounters they had

before the age of 16 in school, in the community, or at home.[36] These include descriptions of witnessing domestic abuse, and enduring physical, or sexual abuse committed by an individual over 18. An example question from the survey in this section is: "Before age 16, how many times did an adult push, grab, shove or throw something at you to hurt you?".[36] The participants report their answers on a scale from 0-never, up to more than 10 times. The survey then collected the information from these individual questions and identified how many different types of maltreatment the participants experienced from zero up to six types. The specific types of maltreatment assessed included witnessing domestic violence, being hit or spanked, being pushed, shoved, or having something thrown at them, being physically attacked, forced sexual activity, and forced sexual touching. The number of types of maltreatment experienced will be analyzed in this thesis. By focusing on the number of types of maltreatment, rather than how often each occurred, it provides a clearer picture of the cumulative impact of different kinds of maltreatment on suicidality. For childhood maltreatment as an exposure variable in Paper 1, participants will be categorized into one of three categories. If the participant did not experience any childhood maltreatment they will be recorded as 0 or none, experiencing one to three types will be recorded as 1 or low maltreatment, and experiencing four to six types will be recorded as 2 or high/severe maltreatment.

Minority status (racialized or sexual identity) is the exposure variable in Paper 2 of this thesis. Population group is the term used in the MHACS that refers to the participants identified racial background (i.e., White, South Asian, Chinese, Black, etc.). This information is used to categorize visible minorities from non-visible minorities.[36] Participants are also asked about their Indigenous identity, and for the purposes of this thesis they will be categorized under minority status as well. Sexual orientation refers to how the participants identify their sexual orientation

(i.e., heterosexual, lesbian or gay, bisexual, etc.). The exposure variable minority status refers to the participants identifying as a visible minority, meaning an individual that is not Caucasian/White, as any Indigenous group, or with a sexual orientation that is non-heterosexual. For this thesis, this will be assessed by a self-report.

Mental health conditions will be a potential mediating variable in both Paper 1 and Paper 2 for this thesis. Mental health conditions of depression and anxiety will be analyzed in this study. Depression and anxiety were assessed using the WHO Composite International Diagnostic Interview-Short Form (or the CIDI-SF).[41] The CIDI-SF was developed from the larger version of the screen by the WHO to evaluate diagnoses of disorders according to the diagnostic and statistical manual (DSM). The CIDI-SF evaluates seven DSM-IV mental disorders including major depression and generalized anxiety which this study will be analyzing.[41] This screening tool was used in the MHACS to identify a lifetime algorithm if the participants met the criteria for a major depressive episode or generalized anxiety disorder. Therefore, using this screening tool, the participant's responses were evaluated to identify if they met the criteria for a mental health disorder of depression or anxiety based on their reported symptoms. Compared to structured psychiatric interview, the sensitivity and specificity of the CIDI-SF are 71% and 82% respectively.[42] This screen is appropriate for large-scale community surveys where an in-depth assessment by a psychiatrist is not feasible. This is applicable to the survey data being analyzed from the MHACS.[42] Childhood maltreatment will also be tested as a mediating variable in Paper 2. For childhood maltreatment as a mediating variable, participants that record no reports of childhood maltreatment will be recorded as 0, and those that report various types of childhood maltreatment (from one to six types) will be recorded as 1.

A directed acyclic graph (DAG), also known as a causal diagram, provides a visual representation of associations between variables to identify potential confounders.[43] The DAGs below indicate the variables age, gender, and visible minority status may be confounders within this thesis (See Figure 1 and Figure 2).

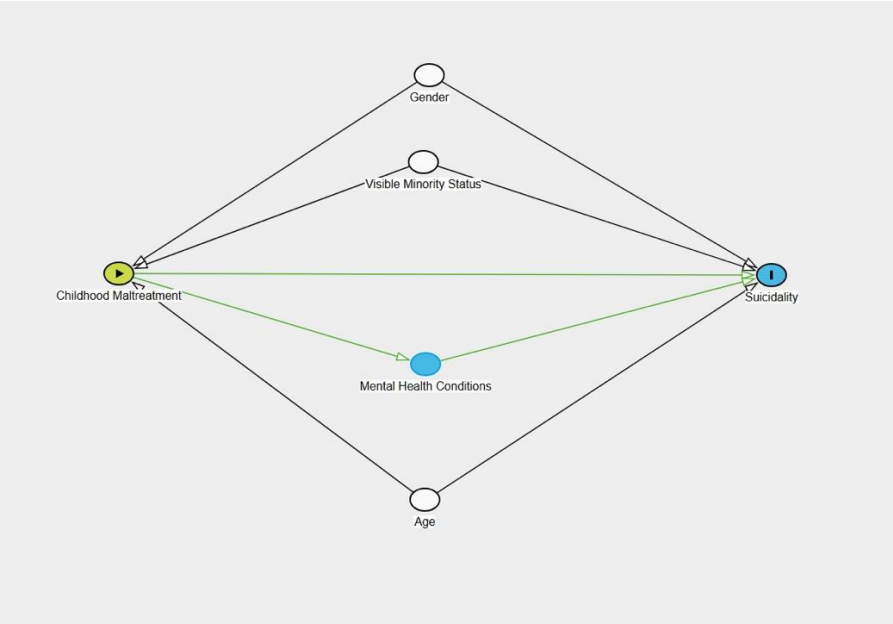

Figure 1. Adjusted DAG for identifying potential confounders to include in the final analysis for childhood maltreatment predictor

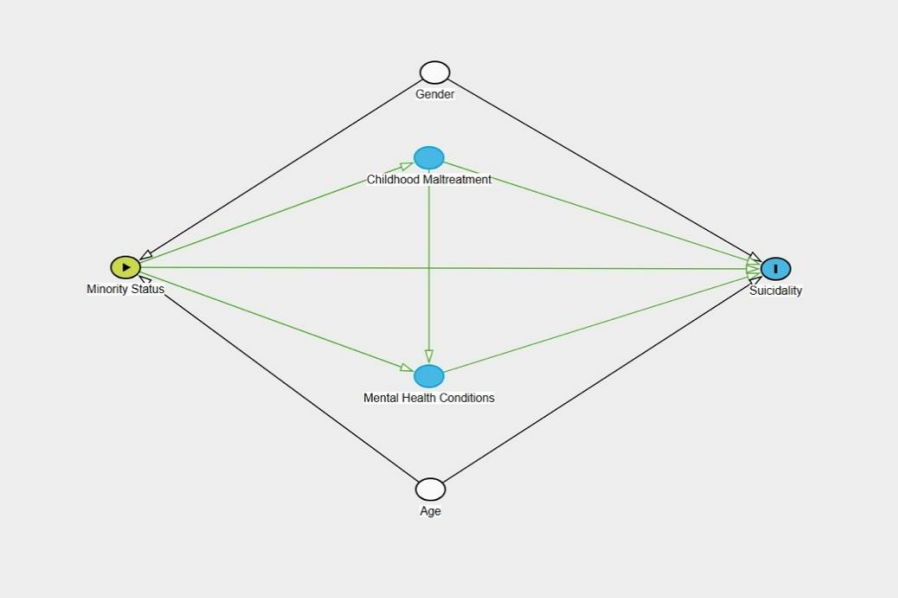

Figure 2. Adjusted DAG for identifying potential confounders to include in the final analysis for minority status predictor

In each DAG the exposure variable is represented by the green oval, the outcome by the blue oval circled in black, and the white ovals are identified as potential confounders. These DAGs have the confounders adjusted and show all biasing paths as closed (indicated by the black lines). The plain blue ovals are on the path between the exposure and outcome and therefore do not represent confounders, but rather the mediating variables. Within the survey, age is collected by the participants' report of their date of birth and age in years.[36] In this thesis only the ages 15 to 24 (Paper 2) and 18 to 29 (Paper 1) will be included in the analysis, and therefore it may not be necessary to control for age as a confounder.

Experiencing childhood maltreatment has been identified as being associated with suicidality.[16, 21, 24] Gender has potential confounding effects as gender may influence the different types of maltreatment experienced.[16] Gender may also be associated with suicidality as rates tend to differ by sex.[15, 46-48] Given the disproportionate rates of childhood maltreatment and suicidality experienced by racial minorities, visible minority status may have confounding effects here as well.[6, 7, 25, 28-30, 49]

Belonging to a racialized group (including an Indigenous identity), or non-heterosexual orientation ("minority status" in the DAG) is directly associated with the outcome of suicidality.[6-8, 44, 45] Gender may be associated with minority status as the rates between females and males may differ. [8] As mentioned, gender may also be associated with suicidality as these rates influence females and males differently as described in previous literature.[15, 46-48] Given these conditions, gender may have confounding effects between minority status and suicidality. See section 1.6 for more information regarding the identification of confounders.

1.5 Biases and Limitations

Selection Bias

There are a few biases and errors in the original survey that must be acknowledged. From the survey, there was a 25% response rate from a total of 9861 participants, indicating a concern for response bias. Although 25% is low, there are other elements to consider. It should be noted that data collection for the MHACS took place over the course of four months, where other telephone surveys such as the CCHS often take place over the course of the full year January to December and therefore may have more respondents. Reports from the Government of Canada[50] also state that when evaluating telephone surveys such as the MHACS there are important areas to appraise alongside response rate including factors related to data quality. Response rate should not alone be considered a direct measure of data quality. The questionnaire design, sample coverage, and data collection quality are elements that should be examined as well.[50] With response rate the particular bias that could pose an issue is non-response bias.[51] Nonresponse bias is the concern that those who did not respond to the survey differ on the key variables from those who responded.[51] In other words, the results would not be generalizable because the respondents in the sample do not adequately reflect the larger population. However, if non-respondents do not differ from the respondents, and the population is covered well, this reduces the concern. The survey description states that there was an adjustment to the survey weights to reduce bias from non-response, and it was noted that the sample coverage was adequate.[36] Additionally, weights will be applied in the analysis phase to account for adequacy of results and generalizability concerns. Given the procedures used to design the MHACS, the inclusion of many stakeholders, and the use of weights to address response rate concerns, estimates from the

sample can be made in this thesis with some confidence in the adequacy of the results as being representative of the population despite the response rate.

Measurement Bias

Some potential measurement biases should also be acknowledged. Computer-assisted interviews create the possibility of interviewer bias. This was minimized due to the structured set of close-ended questions interviewers used for each respondent. Many of the questions within the survey required the participant to recall something from the past, and therefore recall bias may be a concern here. For this thesis, due to the potentially traumatic nature of the variables on which data will be analyzed (i.e., childhood maltreatment, and mental health conditions), the likelihood of the participant's ability to recall these events might be better, therefore minimizing the recall bias. Although, there could be a counter argument made that rather than stimulating recall of the events, the respondents may repress them. Utilizing a younger sample in this thesis could aid in minimizing recall bias based on timing from the events participants are recalling. Some of the questions regarding past mental health conditions or emotions within the survey could also elicit social desirability bias in the participants. With interviews having close-ended questions, not being face-to-face, anonymous, and voluntary, this may limit the chance of a social desirability bias.

Measurement Error

There were computer-assisted telephone interviews utilized for collection of the survey data. An interview was carried out over the phone where the interviewer would likely be provided with a list of phone numbers, they would follow a script, input the respondent answers, and computer software would be used to help navigate the following questions based on respondent answers. Measurement error may have been a concern here because errors in entering

the data could influence the results of the survey. The survey description acknowledges this risk and states there were evaluation procedures put in place, interviewers were observed by someone else, and these data were reviewed following the interview to minimize measurement errors.[36]

Limitations by Design

Utilizing Hill's postulates, which are a set of criteria to determine if an exposure is more than just "associated" with an outcome, can aid in assessing the likelihood of causality between two variables.[52] Given this study is cross-sectional, some Hill's postulates typically cannot be met. Temporal sequence is a postulate that cross-sectional research cannot typically achieve. However, with some of the variables being analyzed in this study, a temporal sequence can be implied. For example, the exposure of racial minority status will inherently occur before suicidality. Logically speaking although not assigned at birth, sexual identity may precede suicidality considering that it does not seem plausible that suicidality would influence one's sexual identity. Therefore, while causality cannot be established, the directionality of the exposure-outcome association is plausible. While it cannot be certain if childhood maltreatment or mental health conditions occurred before suicidality, there is plausible reason to assume this to be the case. For instance, it seems reasonable to assume that enduring trauma at a young age could pose a risk to adult well-being. In support of this assumption a meta-analysis and systematic review found that childhood maltreatment of any kind (sexual, emotional, physical) significantly increased the occurrence of suicidality in adulthood.[53] With the literature regarding the impacts of mental health as an associated risk factor for suicide in general, it is also assumed mental health symptoms would be present before suicidality.[54] Dose-response is something that is often not observed in a cross sectional study, however, using odds ratios and the implied temporal sequence of the exposure variables tested, this will be examined for the study

concerning childhood maltreatment and suicidality. Other Hill's postulates that cannot be met due to the cross-sectional nature of the survey are the experimental design, and strength of association which cannot yet be established. Hill's postulates that can be met or tested in this thesis are implied temporal sequence, plausibility, dose-response, and repetition.

1.6 Analysis Strategy

To examine the research questions for this thesis, all analyses will be conducted within the research data center at the University of Lethbridge. Logistic regression models in R will be used (CI = 95%) while mainly using the survey package.[55, 56] For the first research question, X is how many different types of childhood maltreatment were experienced from none, one to three, or four to six, and Y is past suicidality (yes/no). To assess the potential mediating variable, M, (mental health conditions), logistic regression will be used for the mediation analysis. This model will give an estimation of the odds of Y given their X in addition to the direct and indirect effects estimation. For the second research question, X is whether the participant is a minority (yes/no), and Y is past suicidality (yes/no). To assess the effect of the potential mediator variables, M, (childhood maltreatment and mental health conditions) logistic regression will be used again for mediation analysis to gain an understanding of the direct and indirect effects between the variables. To test for mediation, the framework proposed by Baron and Kenny[57] will be used with logistic regression.

Step 1: Conduct a simple regression analysis to test for the total effect of X on Y using the equation: $Y = B_0 + B_1X + e$

Step 2: Conduct a simple regression analysis to test the effect of X on the mediator variable M using the equation: $M = B_0 + B_1X + e$

Step 3: Conduct a multiple regression analysis to test the effect of X and M on Y using the equation: $Y = B_0 + B_1X + B_2M + e$

To address the missing data in this thesis, listwise deletion will be used. Data such as the MHACS excludes asking questions to certain populations or age groups and therefore imputing data on data that was not collected may not be appropriate. Given the nature of the dataset, listwise deletion will be used, but survey weights will be applied.

Identifying Confounders

A confounder is a third variable that is associated with both X and Y and alters the association between the two.[43] A non-causal association is observed between X and Y, but only because of this third variable.[43] Potential confounders will be identified by using a DAG (see Figure 1 and Figure 2), by meeting the criteria for the three rules of confounding and using Greenland's 10% rule. A DAG, as described previously, is a visible representation of potential associations between variables.[43] The DAG in Figure 1 and Figure 2 indicates potential confounders as the variables represented by white ovals (age, gender, visible minority status). These variables will be tested for inclusion in the final regression models. Potential confounders must also meet the three rules of confounding. The three rules for a confounder are that the variable is associated with X, associated with Y, and it does not lie on the causal path between X and Y. Using the three rules of confounding a DAG can be used to visualize the potential confounders as in Figure 1 and Figure 2. Confounders can additionally be identified using Greenland's 10% rule. This is a statistical method that examines whether a potential confounder changes the coefficient of an exposure by more than 10%.[58] If it changes by more than 10% it will be included as a confounder in the final analysis.

1.7 Anticipated Results

General Hypotheses

It is hypothesized that there will be higher odds of suicidality as the number of types of experiences of childhood maltreatment increases.

It is hypothesized that there will be higher odds of suicidality among minority youth compared to their non-minority counterparts.

Mental Health Mediator Hypothesis for Childhood Maltreatment Predictor

Childhood maltreatment is often a precursor for mental health conditions.[16, 35] Literature also suggests mental health conditions often precede suicidal behaviours.[54] Given this evidence, mental health conditions may play a mediating role between childhood maltreatment and suicidality.

Childhood Maltreatment Mediator Hypothesis for Minority Youth Predictor

The literature suggests sexual and racial minority groups disproportionately experience negative events in childhood when compared to their non-minority counterparts.[25, 27] Childhood abuse despite minority status shows to be associated with suicide later on.[16] It is hypothesized that minorities are more likely to experience childhood maltreatment, and therefore maltreatment may act as a third variable on the pathway from exposure (minority) to outcome (suicidality).

Mental Health Mediator Hypothesis for Minority Youth Predictor

Mental health issues inherently precede suicidality across any group of people. Minorities experience more discrimination, and according to the minority stress theory, have elevated stress levels compared to non-minorities thus increasing the likelihood of a suicidality outcome. Therefore, it is hypothesized that meeting the criteria for mental health conditions of depression or anxiety may explain (mediate) the association between minority status and suicidality.

1.8 Implications

Significance

This thesis will contribute to the emerging research into factors influencing youth suicidality and potentially provide rationale for exploring possible preventative interventions if associations are found. As mentioned previously, recent literature based in the United States has suggested minority youth are more likely to experience thoughts about suicide, attempt suicide, or die by suicide compared to their non-minority peers.[6-8] Not many studies in Canada have explored the group specific factors contributing to these suicide disparities. Additionally, literature suggests that the experience of childhood maltreatment is associated with future suicidality.[16, 21, 24] More recent studies are needed to analyze this association within a Canadian context. This thesis will also explore a potential dose response relationship, assessing how increasing experiences of childhood maltreatment types corresponds to changes in odds ratios. This association has not been well explored in Canada. This thesis will analyze some factors that may be associated with suicidality such as minority status, which is potentially mediated by childhood maltreatment and mental health conditions, and childhood maltreatment which may be mediated by mental health conditions as well. This research has important implications specifically for Canadian youth as there are limited studies being conducted within Canada on these topics.

If each hypothesis is supported and there are associations found between minority status, or childhood maltreatment and suicidality along with mediating factors, it will develop a foundation for research regarding preventative action. These interventions can be targeted specifically for minority populations, increasing their effectiveness. A better understanding of the role of childhood maltreatment will also guide the development of early identification tools

and strategies to reduce future mental health risks including suicidality. If the hypotheses are not supported the research still contributes relevant knowledge to an understudied area. It would also warrant more research to be conducted to explore other contributing factors to suicidality in these populations.

CHAPTER 2: LITERATURE REVIEW

2.1 Why Study Suicide?

Suicide is understood as the intention to cause one's death.[59] Suicide continues to be a serious public health concern worldwide and as of 2020, suicide accounted for over 700,000 deaths each year across the globe.[2] Suicidality is defined by the APA dictionary as a risk of suicide due to suicidal ideation, intent, or a deliberate plan which can also include an attempt.[37] In the United States, among those aged 18 and older, the prevalence of suicidal thoughts and behaviours increased over an 11 year span from 2008 to 2019.[5] In 2019 there were 3.5 million people (1.4%) who reported planning a suicide, and 12 million people (4.8%) that reported having serious thoughts about suicide.[5] The WHO reports that the US is among a few countries where deaths from suicide have increased in the past 20 years.[2] In Canada as of 2019, suicide accounted for approximately 4500 deaths per year or about 12 deaths per day.[60] In Canada, the 2012 CCHS indicated among those 15 years and older, 3.3% of people reported having suicidal thoughts over the past year.[4] Suicidality is a particular concern for youth. According to a 2017 study based on the 2012 CCHS, one in seven individuals aged 15-24 reported having suicidal thoughts.[61] Suicide was the second leading cause of death in Canada among the age group 15-24 as of 2022.[3] There is not a definitive cause that has been identified for suicidality; however, various risk factors have been proposed. Individuals with a history of suicidal behaviour, those exposed to violence, individuals with psychiatric disorders, minority groups, and youth are all at a heightened risk of suicidality.[60] There are also differences in suicide by sex where males are more likely to complete a suicide attempt, but females are more likely to exhibit suicidal behaviours although this disparity may include other factors related to gendered differences such as the performance of masculinity .[60] Understanding the mechanisms that contribute to

suicidality warrants further study to initiate the appropriate preventative efforts against suicide as it remains a prevailing concern.

2.2 Theories of Suicide

The Interpersonal Theory of Suicide

To explain how risk factors can lead to an outcome of suicide, many theories of suicide have been proposed. The interpersonal theory of suicide (IPTS) developed by Thomas Joiner assumes that people die by suicide because they are able and have the desire to.[62,63] The theory is composed of three constructs central to suicidal behaviour that describe an individual's desire for suicide and their capability. These constructs are known as thwarted belongingness, perceived burdensomeness, and the acquired capability for suicide.[63] Thwarted belongingness is a multidimensional concept combining feeling a lack of belonging, a lack of social connection, and feelings of loneliness.[63] Van Orden[63] conceptualizes thwarted belongingness as a combination of loneliness with the absence of reciprocally caring relationships. This construct can fluctuate over time, but the IPTS posits that when thwarted belongingness is present, it can create strong enough feelings for suicidal desire. Perceived burdensomeness is when an individual feels or perceives that they are a burden on others. Typically, these others are family members but can also include other close relations, and this feeling can also create a desire for suicide according to the IPTS.[63] Lastly in the IPTS, to die by suicide, one must acquire the capability for suicide. This is composed of an increased tolerance for physical pain and a reduced fear of death which may be achieved through repeated exposure to physically painful or fear-inducing experiences.[63] An individual can become desensitized to the pain and fear associated with self-harm, which could lead them to engage in increasingly painful, physically dangerous, and lethal forms of self-harm.[63]

The theory includes four hypotheses. The first hypothesis states that thwarted belongingness and perceived burdensomeness are strong enough feelings on their own to cause suicidal ideation even if the individual does not want to actively end their life. The second hypothesis states that when these feelings are present simultaneously, and an individual believes these emotions are unchanging, it is enough to create an active desire for suicide. The third hypothesis says when there is an active desire for suicide coupled with a low fear of death, this can transform into suicidal intent where the individual plans to act on those thoughts. The fourth hypothesis states the outcome of an attempt is most likely to occur when the factors of thwarted belongingness, perceived burdensomeness combined with a sense of hopelessness that these feelings will improve, a reduced fear of death, and an elevated physical pain tolerance are all present.[63]

There have been many applications of this theory in research. One study observed a three-way interaction of the three constructs among college students aged 18-29, supporting the idea that the effect of these constructs individually on suicidal behaviour depends on each other.[64] The study provides support for the IPTS, and that the main constructs contribute to suicidal outcomes. Suicidal ideation and suicide attempt often first appear in adolescence.[65] Therefore, some research has tested the applicability of the IPTS to adolescents. A review article concluded more research needs to be geared towards this as there are very few studies that examine the validity of the IPTS in adolescence, and among the ones that do, there is not sufficient evidence supporting the theory for this age group compared to adults.[65] For example, one study examined adolescents aged 12 to 18 who had reported current depressive, anxiety, or substance use disorders using the IPTS.[66] The participants were oversampled to include individuals with suicidal ideation or a past suicide attempt.[66] The authors concluded there was

some support for the association between feelings of high burdensomeness and suicidal desire; however, the other expected associations were not found for this sample.[66] The authors indicated that the IPTS may not explain suicide among adolescents as well as it does for adults.[66] However, more research utilizing adolescents is needed to support past findings.

The Three-Step Theory

The three-step theory (3ST) of suicide was proposed by E. David Klonsky and Alexis M. May in 2015.[67] The 3ST also adopts an ideation to action framework of suicide similar to the IPTS, and explains the factors that contribute to suicidal desires and attempts.[67] The first step suggests that the development of suicidal desire results from the combination of pain and hopelessness. The theory proposes that if an individual experiences life as painful, or unpleasant, they will develop a strong desire to escape those feelings. Although, as pain alone is not enough to create suicidal desire, feelings of hopelessness are also required.[68] If an individual is in significant pain but believes their situation could improve, their focus will shift to improving the future or enduring the present.[68] However, if they are experiencing pain and are hopeless the situation will improve, an individual may develop a suicidal desire.[68] The second step of the theory describes how pain is associated with connectedness, and how this could lead to suicidal desire. Connectedness is defined as a broad construct that includes various types of connection, such as those with family, peers, a job, pets, the community, one's identity, or any source of purpose or meaning.[68] Klonsky and May[67] state that pain can be a push away from life as described in step one, but connectedness provides a pull toward life.[68] The theory states that when connectedness is greater than pain, suicidal desire will be infrequent and less intense, rather than strong and constant. However, if pain exceeds connectedness, the desire for suicide may increase.[68] The third and final step in the 3ST suggests a strong desire for suicide may

progress to a suicide attempt.[68] Similar to the IPTS, progression from desire to an attempt develops when there is capability for suicide. The theory posits that there are three types of capability being acquired, dispositional, and practical.[68] The theory describes attempting suicide as something fearsome and painful.[67] Humans are inherently inclined to fear and avoid pain, injury, and death. Therefore, according to the 3ST, attempting suicide partially depends on overcoming those fears.[68] The authors of the theory propose these fears can be overcome through life experiences (i.e., engaging in self-harm, having a history of physical or sexual abuse, drug use, or working in stressful environments like medical professions) which can habituate individuals to a fear of pain, injury, or death.[68] This describes acquired capability where exposure to these experiences can decrease fear associated with suicidal behaviours.[68] Dispositional capability for suicide describes how an individual's biological makeup, emotional predispositions, or personality can reduce their fears of engaging in suicidal behaviours.[68] For example, someone who is more inclined to take risks, or has a low pain sensitivity may be more capable of a suicide attempt than someone who has a higher sensitivity to pain.[68] The last type of capability called practical capability describes various factors that may enable an individual to access or use of lethal means to harm themselves.[68] The theory states that not all of the forms of capability need to be present or high, but rather the focus is on if the capability for suicide is adequate for an individual with a strong desire for suicide to make an attempt.[68]

The 3ST provides a framework for understanding how ideation can progress to a suicidal attempt. This theory could be useful in helping to identify factors that contribute to pain, hopelessness, disconnection, and suicide among particular groups. For example, the 3ST could be applied to explain how experiences of racism or discrimination may lead to suicidal thoughts. Discrimination is a painful experience that can diminish hopes for success and limits

opportunities for forming meaningful connections with others and society, connections of which are more readily available to non-marginalized individuals.[68]

Research in Canada has been conducted to assess the 3ST. One study applied the 3ST to a sample of adult psychiatric patients, where they assessed the validity of the theory as well as its predictive utility.[69] The participants were assessed at baseline, four weeks, and three months following their discharge. To examine step one of the theory, it was found that pain ($r = 0.71$) and hopelessness ($r = 0.77$) were strongly associated with suicidal desire and strongly associated with each other ($r = 0.73$).[69] Further examining this step, hierarchical multiple regression was used to identify if pain and hopelessness together contributed to suicidal desire. A significant result revealed that pain and hopelessness interacted to predict suicidal desire as hypothesized by the theory. The model at baseline with pain and hopelessness explained 68% of the variance in suicidal desire, and the interaction term contributed an additional 4%.[69] With regards to the predictive utility of this step, pain and hopelessness were reportedly both robust predictors of future suicidal desire at the four week and three month time point, even after controlling for baseline depression and lifetime suicidal ideation.[69] However, the interaction between pain and hopelessness did not predict future suicidal desire, suggesting these variables contribute independently over time.[69] For step two concerning connectedness with suicidal desire, baseline data was examined for a subgroup of participants with high pain and hopelessness. Results showed that connectedness and suicidal desire were inversely related ($r = -0.53$, $p < 0.001$), and the researchers found that when pain exceeded connectedness suicidal desire increased.[69] When assessing the predictive utility of step two, it was found at both time points that connectedness prospectively predicted suicidal desire with the same inverse association.[69] The third step regarding capability was only partially supported in this study. In testing practical capability, it

was found that this predicted past suicide attempts or reattempts following admission and discharge.[69] The other capability measures (acquired and dispositional) did not exhibit or had weak associations with past and future attempts.[69] In a similar study assessing the 3ST, a community sample of adults in Vancouver, British Columbia between the ages of 35-90 was used.[70] Similar models and methods were used as the previous study, although there were only two timepoints at baseline and at a six month follow up. An interaction between pain and hopelessness was found for predicting suicidal desire.[70] The regression model explained 47% of the variance without the interaction term, increasing by 3% when it was included. At the follow up, the variance changed to 52% explained without the interaction term, with an additional 4% when it was added.[70] Supporting step two, among individuals with high pain and hopelessness, suicidal desire was strongly associated with how much their pain scores exceeded their connectedness, and this was consistent both at baseline and the six month follow up.[70] Predictive utility was tested for this study as well with each variable having predictive ability for suicidal desire six months later.[70] The third step regarding capability was not examined in this study.

There is a lack of studies with direct applications of the 3ST to samples of youth. However, there are some studies that support some of the steps of the theory in samples of adolescents. In a study with inpatient adolescents who had a recent suicide attempt, it was found that pain and hopelessness were the strongest motivations for attempting suicide.[71] Also, in a community sample of adolescents, pain was associated with suicidal ideation in the present and future.[72] For connectedness, in a community sample of adolescents it was found that when social and parental connectedness increased, suicidal ideation decreased. Additionally, among those with suicidal ideation, school connectedness decreased the likelihood of a suicide attempt. These findings support the protective aspect of connectedness as predicted by the 3ST.[73] Lastly, in

terms of capability one study found from a large community sample of adolescents that being exposed to close others self-harm, indicating pain habituation and knowledge of methods, was a key factor in distinguishing those with suicidal ideation from suicide attempters.[74] However, over time it is reported that dispositional factors (such as personality traits) along with acquired capability factors, were stronger predictors of a suicide attempt than just exposure to self-harm.[75] This suggests that factors associated with having a past attempt might be slightly different than factors that predict an attempt.

2.3 Youth Mental Health

Youth mental health, including suicidality, continues to be a topic of concern in Canada and the United States. Globally, suicide among youth (ages 15-29) accounts for about 8.5% of all deaths.[1] Much research has attempted to examine the causes of youth suicide, although it has been concluded that the etiology of suicide is not yet fully understood.[76] Studies continue to report on predictors and potential risk factors contributing to youth suicide. Suicidal ideation tends to increase between the ages of 12-17, and suicide death becomes increasingly common by 15-19 years old.[77-79] A recent umbrella review of systematic reviews supports these findings stating that rates of suicide in recent years have increased for the adolescent age group 15 to 19. The literature suggests this to be due to a combination of psychological, biological, and social changes related to this developmental stage.[80] Additionally, suicidal adolescents are approximately 12 times more likely to attempt suicide by age 30, suggesting ideation as a prominent precursor of a suicide attempt.[81]

Other factors associated with youth suicidality have also emerged in literature. Strong evidence, mainly from cohort studies, suggests childhood abuse, feelings of worthlessness, and low self-esteem are some risk factors associated with suicidal thoughts and behaviour among

youth.[76] While global comparisons of suicide can be useful, trends of youth suicide may diverge from overall national patterns. For example, some countries with high youth suicide rates may rank lower in overall suicide rates across all age groups.[76] This points to the importance of examining youth suicidality as a distinct public health issue, shaped by unique age-specific risk factors, and it reinforces the need to address youth mental health separately from general (adult) suicide trends.

Studies conducted in Canada have explored youth mental health and suicidality, and they offer valuable insights into current trends surrounding these issues. A study examining a sample of youth aged 12 to 24 on their mental health trends over a seven year span utilizing the CCHS from 2011 to 2018, indicated a rise in the prevalence of mental health issues, diagnoses, and consultations.[82] The study reported a significant increase in the prevalence of poor or fair mental health from 4.2% in 2011 up to 9.9% in 2018. There were also significant increases in diagnoses of mood and anxiety disorders from 4.3% to 7.8%, and 6.0% to 12.9% respectively. The prevalence of the diagnoses increased for all age and sex groups, with the exception of mood disorders among adolescent males aged 12 to 18.[82] The proportion of youth who consulted a health care professional in the past year for a mental health related issue increased from 11.7% in 2011 to 17.0% in 2018.[82] Lastly, past-year suicidality was also examined and from 2011 to 2016 it increased from 3.0% to 5.8%.[82] This study highlights the upward trend of mental health challenges among Canadian youth, underscoring the importance of age-appropriate interventions. Other studies have conducted similar research to this one. Another study using a birth cohort from Quebec, Canada documented the prevalence of suicidal behaviours such as passive ideation, serious ideation, and suicide attempts along with mental health outcomes correlated with these behaviours in adolescence aged 13-20.[32] Across the entire sample, ideation

(both passive and serious) increased throughout adolescence, but the prevalence of suicide attempts stayed constant.[32] The results suggest that by age 20, about 9.8% of adolescents experience serious suicidal ideation, and about 6.7% have attempted suicide. The prevalence of passive suicidal ideation, meaning thinking about suicide without necessarily having the intent to act, was approximately 22.2%.[32] It was reported that those presenting with depressive symptoms may be at an increased risk of suicidal ideation or a suicide attempt.[32]

Other research has explored how broader contextual factors such as the COVID-19 pandemic may have impacts on youth mental health. A cohort study conducted at a Canadian university examined the mental health of first-year undergraduate students from prior to the COVID-19 pandemic to after.[83] There were multiple cohorts in the study including those students that began their studies in 2018, 2019, and 2020. The samples were matched to account for any differences in risk factors. The results showed that among the students that began their studies in the fall of 2020, during the height of the pandemic, reported higher rates of depression, anxiety, insomnia, and self-harm compared to those who entered before the pandemic.[83] When examining differences from 2018-2019, there were noticeable increases in depression, anxiety, and suicidal ideation for both male and female students.[83] In both the 2018 and 2020 cohorts, it was reported that symptoms of common mental health concerns were more pronounced following the first year of university. In particular, female students in the 2020 cohort showed a heightened risk for anxiety throughout the year compared to those in the 2018 cohort.[83] The mental health concerns remained prevalent across all cohorts, but the severity of these concerns were elevated during periods of the pandemic restrictions.[83] This study highlights how the pandemic could have contributed to worsening mental health outcomes among a population of youth who are already vulnerable to mental health challenges. Another study had similar results

and showed that Canadian students with no pre-existing mental health problems reported an increase in psychological distress during the pandemic.[84] The consequences of the pandemic are important to acknowledge as it is a significant contextual factor contributing to youth mental health in Canada in the past recent years. External stressors such as a pandemic may exacerbate existing stressors especially among vulnerable populations like youth.

Studies from the United States report similar findings regarding youth mental health and suicidality. One study examining mental health diagnoses prior to suicide found that among all youth, approximately three of five who died by suicide did not have a documented mental health diagnosis.[85] Additionally, racial minority males and younger youths were less likely to have a diagnosis compared to white female, and older youths respectively.[85] Information from the Centers for Disease Control and Prevention (CDC) has indicated that among youth 10 to 24 years old from 2010 to 2021 almost 72,000 of them died by suicide. Over this time period, annual suicide rates increased approximately 50%.[86] These types of research studies exemplify the severity of youth mental health and provide insight into how there may be unique risk factors associated with youth that should be further explored.

Differences by Age and Sex

Suicide rates tend to differ by age and sex. As mentioned, youth suicide is a prevalent issue as one of the leading causes of death worldwide.[1] Studies from the United States show rates of suicide are typically higher among males than females across all age groups.[46] In 2018, rates of male suicides were 3.7 times the rates of female suicides.[46] However, over the time period of 1999 to 2018, suicide rates for females increased by 55%. During this time, suicide rates for males increased as well but only 28%.[46] For adolescents, similar trends have been reported by examining the time period of 1991 to 2019, where non-fatal suicide attempts rose for male

adolescents at a rate 20 times greater than for females.[47] In Canada, for death by suicide across all age groups in 2022, males accounted for 75% of these.[48] Within the same year suicide was the second leading cause of death for youth males and youth females in the age groups 15-19 and 20-24, however suicide mortality was higher for males than for females.[3] These findings all illustrate the complex nature of suicide and how it may differ for different groups.

The cohort study conducted by King et al[83] on the impact of COVID-19 on the mental health of first year undergraduate students reported sex specific findings as well. The results showed for students in both cohorts one and three, who entered university in Fall 2018 and Fall 2020 respectively, mental health issues were more severe at follow-up than they were at baseline.[83] However, for female students, accounting for their initial mental health status, those in cohort three had a significantly increased likelihood of developing anxiety symptoms meeting clinical thresholds over the study period compared to those in cohort one.[83] In comparison, there were no significant differences for males between the cohorts in rates of anxiety, or other mental health concerns such as depression or insomnia.[83] Similar trends have been documented in longitudinal studies. For example, Wiens et al[82] reported that between 2011 to 2018, young adult females (aged 19 to 24) had the most significant increase in the prevalence of poorly rated mental health, rising from 5.4% to 15.6%.[82] Adolescent females (aged 12 to 18) showed the next largest increase from 3.8% to 9.5%, while males across both age groups exhibited smaller changes of 4.8% to 9.3% for young adults and 2.7% to 5.5% for adolescents.[82] Additionally, young adult females showed the greatest increase in past year suicidality prevalence from 1.8% in 2011 to 7.4% in 2016, compared to no changes in the other age and sex groups.[82] In support of these findings, another study reported that the female youth in their sample had higher odds of having a documented mental health diagnosis compared to males.[85]

Studies have shown that females are more likely to experience suicidal thoughts, and non-fatal suicide attempts than males.[32] In one study it was found that the prevalence of all suicidal outcomes they assessed, passive ideation, serious ideation, and suicide attempts, were found to be nearly twice as high in adolescent females compared to adolescent males, but both groups followed similar trends over time.[32] In the same study, mental health symptoms, mainly depression, were strong predictors of future suicide outcomes.[32] Examining more age specific trends, at age 13 depressive symptoms showed the strongest associations with passive ideation (RR = 2.57), serious ideation (RR = 2.99), and suicide attempts (RR = 2.93).[32] Anxiety also showed significantly significant associations with these outcomes, although across all age groups depression was consistently the strongest risk factor.[32] The prevalence of suicide attempts remained stable across adolescence, however, serious suicidal ideation increased by 40% in late adolescence from the ages of 17 to 20, which highlights the increasing mental health concerns during this developmental stage.

According to the CDC female youth often do show higher proportions of negative mental health outcomes compared to adolescent males.[87] However, as mentioned some studies show rates of suicide deaths are often higher for males.[46] In a study examining the role of technology in youth suicide deaths for the ages of 10 to 17, most deaths occurred among White adolescent males with rates increasing with age.[88] So, although female adolescents are more likely to report negative mental health symptoms adolescent males died by suicide at more than twice the rate of their female peers in this study.[87,88] For this particular study investigating the role technology plays, it was found that the proportions of suicide cases with the use of technology and without the use of technology were nearly identical indicating the higher rate of suicide death among the adolescent males may reflect a broader, underlying trend.[88] It is important to recognize the

differences in how depression and suicidality may manifest or be expressed among males and females. Although females tend to show higher rates of ideation, or depression diagnoses this may be attributed to masculine ideals and the societal expectations of men.[89,90] Research shows that men may avoid their emotions, or find ways to escape their pain, rather than expressing the negative feelings they have.[91] Studies show that there is an overall lack of engagement with healthcare professionals by men, fear of judgement around seeking help, a sense of embarrassment, and continued stigma around men's mental health.[89,90] These findings suggest that men may often suffer in silence, turning to gender-normative strategies for coping, and therefore giving the impression that their experiences differ from those of women. Examining the method of an attempt may also contribute to the gap observed between higher negative mental health symptoms in females with higher suicide mortality among males.[88]

Theories pertaining to why these rates differ by sex include those about the method of an attempt, as well as potential gender-based reporting biases. Males and females may resort to different means of suicide for reasons such as having access and familiarity with the resources used, or utilizing methods that will achieve their true intent.[92] It has been argued that females may utilize less lethal methods of suicide because they have less intent to die.[93,94] A study conducted in Canada examined the means of suicide from 1981 to 2018 and reported suffocation as being the most utilized method for both males and females, although more males died by suicide over this time period.[95] Males were significantly more likely to use firearms than females, and the next most common mean of suicide for females was intentional poisoning.[95] In a study of psychiatrically hospitalized adults in Rome, Italy females were more likely to use drug or poison ingestion as a method of attempt compared to males (72.8% vs 51.4%), and males were more likely to use hanging (20.3% vs 6.8%).[96] This study included an assessment of

lethality using a "risk score", where a higher score indicated a more lethal attempt, and a "rescue score" which reflected how likely an individual was to be saved from their attempt.[96] It was found that the risk score was higher for males than females (3.76 ± 0.68 vs. 3.49 ± 0.72), and the rescue score was higher for females than males (2.79 ± 1.09 vs. 2.43 ± 1.22).[96] While the method of attempt is an important difference established between males and females when it comes to suicide, gender norms may play a role as well. More lethal means, or lethal methods of an attempt among males may be attributed to the way in which they express their masculinity. Some research has suggested for some men, a lethal suicide attempt can be attributed to their final performance of masculinity.[90] The difference in choice of lethal means may be attributed to a variety of factors such as a woman's lesser intent to die, a demonstration of masculinity, gender socialization, or the accessibility of methods for men and for women.[96]

2.4 Minority Disparities and Suicide

The Employment Equity Act of Canada defines minorities (visible minorities) as those, other than Aboriginal peoples who are not Caucasian or White.[97] While this definition excludes Indigenous peoples, for the purposes of the following research, both Indigenous individuals and visible minorities are collectively referred to as racialized minorities. Using this terminology acknowledges the unique ways systemic racism, and marginalization can contribute to suicidality among youth from these populations in Canada which will be expanded on in the following sections. Sexual identity minorities consist of LGBTQ+ members who identify with a non-heterosexual orientation and will be referred to as individuals belonging to a sexual identity minority. There are many disparities between minority status individuals compared to their non-minority peers when it comes to suicide. The factors contributing to suicide in minority groups tend to differ from the general population because of their minority status. A recent systematic

review found that minority status is an important risk factor to consider as often these individuals face higher levels of discrimination and stigmatization, therefore subjecting them to a higher rate of suicidal behaviours.[80] For example, among racialized minorities, racial discrimination generally acts as a precursor for many mental health conditions including suicide.[6]

Racialized Minorities

Recently over the past few years, racial minority suicide has emerged as a pervasive issue. A study from 2023 by Keum[6] found the highest risk of suicide deaths for racialized minority youth arises between the ages of 18 to 29. However, another report found as of 2017, among Black youth both male and female aged 10 to 19, suicide was the second leading cause of death with the rates rising from 2.55 per 100,000 in 2007 to 4.82 per 100,000 in 2017 in the United States.[7] Additionally, for those youth that participated in the United States national Youth Risk Behaviour Survey, self-reported suicide attempts rose by 73% for both Black male and female adolescents between 1991 to 2017, and injury by attempt rose by 122% for Black adolescent boys.[7] Overall, suicide death rates were reported to be increasing for Black youth faster than any other racial group.[7] These findings contradict the historical context of Black suicide as Black youth have not always been labeled as being at a high risk for suicidal behaviour.[7] It has been suggested that Black suicide is often under-reported or even misclassified, potentially eliciting a misinterpretation of the historical evidence of suicide among Black individuals.[9,10] A recent systematic review has also suggested that Black youth are often not sufficiently represented in suicide intervention research, making it difficult to address this disparity effectively.[98]

From 2018 to 2019, a study reported that age-adjusted suicide rates decreased for White individuals but increased for Black and Asian individuals, indicating a higher suicide risk for

racialized groups compared to their White peers.[49] As racial and ethnic suicide rates have increased in the United States especially among the Black population, there is another alarming disparity in suicide deaths among Indigenous groups. Among all groups, American Indian and Alaska Native youth represent less than 1% of the youth population aged 10-19, yet they experienced the highest suicide rates with 41.9 deaths per 100,000 in 2020.[86,99] While these Indigenous groups experienced the highest rates of suicide, Black youths experienced the most rapid increase in suicide rates from 6.9 deaths per 100,000 in 2010 to 12.9 per 100,000 in 2020.[86] According to the CDC in 2020, suicide was the third leading cause of death among Black Americans aged 15 to 24.[100] While these rates of suicide are concerning for racial minority youth, these groups are significantly less likely to have a documented mental health diagnosis prior to their death by suicide, compared to older age groups.[85] This suggests potential gaps in access to care, discrimination, or stigmatization for these populations.

Studies have been conducted examining the effects of discrimination, mental health symptoms, and suicidality. A study conducted by Walker et al[101] on the effects of perceived racism reported that the perception of racism by African American adults was significantly correlated with suicidal ideation ($r = 0.13$), and to symptoms of depression ($r = 0.32$). However, it was found that although perceived racism was directly and significantly associated with suicidal ideation, this association was fully mediated by depressive symptoms.[101] An interesting finding from this study was that extrinsic religiosity, defined as using religion as a source of social support and community, served as a protective factor against suicidal ideation. Those with extrinsic religiosity decreased the likelihood of experiencing suicidal thoughts in the presence of depressive symptoms.[101] Studies such as these emphasize that there are many factors that may

contribute to suicidality among minority groups, although it is also important to consider the potential protective factors as well for these vulnerable groups.

Studies concerning minority suicidality have predominantly been conducted in the United States, however, racialized groups including Indigenous groups show increased risks in other countries as well. For example, a systematic review revealed that globally in high and low- and middle-income countries, suicide rates are often elevated in Indigenous populations compared to non-Indigenous groups.[102] They state that there are some variations in these rates across the countries, but there are notable disparities reported. In Canada in particular, Indigenous populations across the country are at a significantly elevated risk for suicide compared to non-Indigenous groups. Indigenous groups in Canada consist of individuals belonging to First Nations, Inuit, and Métis populations. By examining rates of suicide from 2011 to 2016 in Canada, First Nation suicide rates were 24.3 deaths per 100,000, a rate three times higher than the rates for non-Indigenous Canadians.[14] These rates were higher among males than females, and in the context of youth they were highest among the age group of 15 to 24.[14] Among Métis individuals the rate of suicide was 14.7 per 100,000 nearly twice as high as the rate of non-Indigenous people, again with males having higher rates than females by more than three times.[14] For Inuit individuals, suicide rates were 72.3 per 100,000 which was nine times higher than the suicide rate among non-Indigenous Canadians with males exhibiting higher rates than females, and suicide rates being the highest among Inuit youth.[14] Although males tended to show higher rates than females, for Inuit females aged 15 to 24, the suicide rates compared to non-Indigenous females in the same age range were 33 times higher.[14] Racialized groups are evidently at an increased risk for suicide, warranting more research aimed at understanding this gap.

Individuals Belonging to a Sexual Identity Minority

Individuals belonging to a sexual identity minority have shown to be at an increased risk of suicide compared to their heterosexual peers.[8] Research suggests that up to 20% of sexual identity minorities attempt suicide during their lifetime, experiencing two to five times the rate of attempts compared to heterosexual individuals.[103] In support of these findings, a longitudinal study conducted in the United States that followed 10th graders annually from the age of about 15 to 22 found that those identifying as a sexual identity minority had a significantly higher prevalence of suicidality.[104] For example, the prevalence of suicidal ideation among sexual identity minorities was 26.1% versus 13.0% for heterosexual individuals, the suicide planning prevalence was 16.6% versus 5.4%, and attempts were 12.0% versus 5.4%.[104] Additionally, at the onset of ideation, planning, and attempts, sexual identity minorities were typically younger when the suicidal behaviours began compared to the heterosexual counterparts.[104] These researchers used Cox regression models to examine the association between sexuality and timing of the suicidal behaviours. It was found that identifying as a sexual identity minority was associated with a 77% increased risk of suicidal ideation at a younger age (HR = 1.77; 95% CI[1.03, 3.06]), and a 2.69 times increased risk of earlier suicide planning (HR = 2.69; 95% CI[1.30, 5.56]) compared to heterosexual participants.[104] There were no statistically significant differences reported in terms of timing for suicide attempts.[104] As mentioned previously there are theories of suicide that utilize an ideation to action framework.[62,67] Utilizing that theoretical basis, Luk et al[104] analyzed the progression from ideation to a plan, and from a plan to an attempt.[104] It was found that from those participants who reported suicidal ideation, there was 43% who had a suicide plan, and from those with a plan, 64% went on to attempt suicide.[104]

These disparities faced by sexual identity minorities are even further magnified in times of crisis. Utilizing data from the 2015, 2016, 2019, and 2020 CCHS, research was conducted to estimate the prevalence of suicidality among sexual and gender identity minority populations prior to, and during the COVID-19 pandemic.[105] It was found that there was an increase in recent suicidal ideation from 8.5% to 13.3% among sexual and gender identity minority populations.[105] This increase was prominent among males and individuals aged 15 to 24. This result contrasted the slight decrease in recent suicidal ideation experienced by the heterosexual and cisgender population.[105] Prior to the pandemic there were already large disparities for the prevalence of suicidality. Suicidal ideation prevalence among bisexual or pansexual individuals was 14.0% compared to 5.2% for gay or lesbian individuals and 2.4% for heterosexual individuals.[105] Suicide attempts followed a similar trend of 16.6%, 8.6%, and 2.8% respectively.[105] Other Canadian data corroborates these findings with a study pertaining to gay and bisexual men that found they are significantly more likely to have depression (OR: 2.25; 95% CI: 1.35, 3.75), and a higher prevalence of suicidal ideation when compared to heterosexual men.[106]

Studies pertaining to youth have identified LGBTQ+ youth as having three times higher adverse suicidal outcomes than their straight peers, with a higher prevalence of attempts.[12] In Canada, research indicates this to be true as well. In a study conducted with university students, those identifying as LGBTQ+ were 2.6 times more likely to have serious suicidal ideation, and 5.8 times more likely than their heterosexual peers to have thoughts about suicide over three times in the past year.[13] Additionally, they were 7.5 times more likely to have a suicidal attempt, 11 times more likely to have attempted suicide truly intending to die, and 10.3 times more likely to report a likelihood of a future attempt compared to heterosexual participants.[13] Other Canadian data supports these findings. In a study utilizing the 2019 Canadian Health Survey on Children

and Youth analyzing adolescents aged 15 to 17, it was found that for girls who reported being attracted to other girls, there was a 3.63 times increased risk of past year suicidal ideation (RR = 3.63; 95% CI[2.59, 5.08]), and a 3.31 times increased risk of a past suicide attempt (RR = 3.31; 95% CI[1.81, 6.06]) compared to their heterosexual peers.[107] Adolescents that reported being attracted to more than one gender also had elevated risks for both ideation (RR = 2.51; 95% CI[2.12, 2.98]), and attempts (RR = 2.83; 95% CI[2.18, 3.68]) compared to the heterosexual participants.[107] There was a similar pattern found for boys who reported being attracted to boys, however the results were not statistically significant for this sample.[107]

Although quantitative data is useful to identify associations and trends, qualitative research offers valuable insights into reasons behind suicidality as well. In a study analyzing sexual and gender identity minority individuals over the age of 18, it was found that among those individuals who had attempted suicide, 72% reported having more than one attempt, with an average age of 17 at their first attempt and last attempt at age 23.[108] Emotional issues such as loneliness, feelings of worthlessness, and hopelessness were commonly cited as reasons for an attempt.[108] These feelings support the theories of suicide mentioned previously as well, offering real-world examples through participants own words that the theories aim to explain.[62,67] Many participants also reported struggling with untreated depression and anxiety, difficulty accessing support, and feeling emotionally overwhelmed.[108] Others discussed social stressors such as bullying conflict, and minority stress associated with their sexual or gender orientation as contributors to suicidality for themselves.[108]

2.5 The Minority Stress Theory

To address disparities such as suicide within minority populations, the mechanisms contributing to these rates must be explored. A model of minority stress was proposed by Ilan

Meyer[11] in 2003. This theory was originally geared towards explaining factors related to mental health inequities among sexual identity minority populations, however, it has been applied to include other minority groups since then.[109] Minority stress refers to the pressure experienced by all minorities due to their social identity.[11] An individual's social identity can encapsulate their race, sexuality, or gender. This may lead to them enduring excess stress in the form of discrimination or prejudice in addition to general stressors of day-to-day life.[109] There are various excess stressors that a minority individual can encounter. Frost and Meyer[109] describe distal stressors as those that originate from people or institutions. These include laws or policies that are discriminatory, loss of employment, being a victim of violence, living in poverty, being treated unfairly, being disrespected, or everyday experiences of discrimination.[109] There are also proximal stressors that come from socialization, including hiding one's identity, learning to reject themselves for being part of a minority group, or developing expectations to be stigmatized due to normative societal views.[109] Overall, according to the minority stress theory, minority groups are subject to greater stress than non-minorities.[11] Members of minority groups may experience greater negative health outcomes due to these stressors, thus driving large health disparities.[109, 110]

Health Inequities and Institutional Racism

The concept of racism is rooted, whether intentionally or not, into societies. Institutional racism describes how societies continue to foster discrimination by reinforcing inequitable systems such as housing, income, education, healthcare, and others.[111] Due to historical roots, these systems portray discriminatory practices, and values which leads to a high risk of adverse outcomes for certain groups.[111] For example, in the United States some neighborhoods are identified as being predominantly composed of racialized minorities or they are predominately

White, indicating a sense of unintentional segregation.[112,113] The issue with this separation is that it ends up shaping an individual's access, utilization, and even the quality of healthcare services.[112,113] If neighborhoods are composed of mainly Black, or other racialized minority individuals, there tends to be an inadequate investment of health promoting resources, lower-quality facilities, and fewer healthcare providers that have the appropriate qualifications than those in higher income communities.[112,113] This unfortunately results in an inequitable system that puts racialized minorities at a high risk of racially biased care.[112,113] Many studies have consistently demonstrated that the experience of racial discrimination, whether that be directly or through indirect pathways as described above, is often associated with symptoms of depression, anxiety, or other mental health concerns among Black adolescents in particular.[114] Other studies have mentioned the challenges of intersectionality. Participants have reported that they have been discriminated against based on their intersecting social identities of gender, migrant class, and ethnicity.[115-117] Others have reported on how the intersectionality of an LGBTQ+ identity along with a racialized minority status produces an additional layer of issues.[118,119] They indicated that for visible minority refugees belonging to a sexual identity minority, access to good quality care services was difficult to obtain because of how rare it was to find a provider who worked with or understood the intersecting minority context they come from.[118,119]

Health inequities occur in the Canadian context as well. In Canada there are major income related inequalities prevalent among Indigenous populations.[117] A study in 2012 found for Indigenous peoples living off-reserves there was a high prevalence of psychological distress, suicidal ideation, and suicide attempts related to income-related inequalities.[120] Based on the evidence about institutional racism, there is an argument to be made that these disproportionate results of income-related inequalities are driven by such systems. A qualitative study that took

place in Canada examined four central questions around racism of Indigenous peoples in the healthcare system.[121] The researchers aimed to analyze its root causes, the factors that sustain it, its impacts on Indigenous health, and what must be done to eliminate it.[121] Based on 299 interviews and eight focus groups with First Nation men and women from eight Manitoba communities, the study revealed how systemic racism contributed to poor health outcomes, greater exposure to risk, and limited access to care.[121] The participants expressed deep-rooted mistrust of Canadian institutions due to the consequences of colonization, residential schools, and ongoing interpersonal trauma.[121] Many individuals expressed that they felt their healthcare needs were consistently not met or they were not a priority due to financial, jurisdictional, or political considerations.[121] A prominent theme from the respondents was the dominance of English and biomedical approaches that excluded non-English speakers, those unfamiliar with medical terminology, and individuals with limited literacy skills. Along with this theme, participants mentioned the destruction of traditional First Nation healing knowledge as the Canadian system often favours Western practices to serve the interest of non-Indigenous peoples.[121] One of the most blatant encounters of racism, and a harmful stereotype encountered by participants was the assumption that all Indigenous people suffer from alcoholism, and therefore these individuals often experienced biased care and false accusations of drug-seeking.[121] This type of discrimination resulted in belittlement, neglect, and worsening conditions, making many individuals avoid seeking care altogether.[121] The system also often fails to acknowledge the barriers faced by these populations that could hinder their access to care. Many participants mentioned socioeconomic concerns and the challenge of having to travel long distances to reach a hospital.[121] These issues were explicitly from the perspectives of First Nation individuals, however, given the evidence of the inequitable system society has built, these

concerns are likely relevant to other minority groups in Canada as well. All these findings highlight the need to address concerns of inequities and institutional racism, as the current structures not only perpetuate discrimination but also disproportionately harm those who are already the most vulnerable.

The Stress Response

When an individual experiences social stressors that they perceive as encounters of discrimination or racism, this can lead to a stress response in the body that may influence mental and physical health.[111,122-124] These may include everyday discriminatory experiences in restaurant services, poor customer service, being followed in stores, or just being treated with less respect than others. These would be described as chronic stressors, which evidence shows, they can influence changes in brain chemistry or metabolism as a biological response. [111,122-124] Evidence continues to emerge that links experiences of discrimination with increases in allostatic load, and inflammatory biomarkers as well. Studies have shown that for African Americans with high levels of perceived discrimination, there are increased levels of inflammatory biomarkers that have been linked to chronic conditions and even cancer.[110] Racist or discriminatory encounters that suddenly arise may be perceived by an individual as threatening.[6] As a response, these individuals portray trauma-like symptoms including emotional distress, avoidance, and hypervigilance.[6] These symptoms manifest as a survival strategy acting to minimize any stress and tension resulting from discrimination, but in turn they predispose these individuals to a risk of adverse health outcomes such as suicide.[6] This stress response and increases in allostatic load can begin in childhood and leave them vulnerable for long-term risks of negative health outcomes.[125] This may manifest from chronic discrimination, however, children from low-income homes, or those that experience abuse or neglect may be subject to a higher allostatic

load than their peers.[125] This can lead to more behavioral issues among them, and poor mental and physical health in the future.[125]

2.6 Childhood Maltreatment and Suicide

Childhood abuse and maltreatment is a major public health concern that has shown associations with future mental health issues such as suicidal ideation and attempts. Studies in Canada have indicated a large proportion (32%) of the population reported having experienced childhood abuse.[16] Childhood abuse and maltreatment in the form of being witness to domestic violence, emotional, physical, and sexual abuse have all been found to be significantly associated with outcomes of mental disorders, suicidal ideation, and suicide attempts.[16] Other studies report that among those that experienced suicidal ideation in the previous 12 months, many (61.2%) reported high rates of childhood abuse.[24] Suicide attempts were much higher among those who reported experiencing childhood abuse compared to those that did not.[24] Across sexes in Canada, females are reportedly more likely than males to have experienced sexual abuse, or be a witness to domestic violence.[16] Males have shown to be more likely to have had an experience of physical abuse compared to females.[16]

Childhood maltreatment and mental disorders have shown to have a connection with increased suicide risk, and the IPTS offers a framework to understand this association. The presence of childhood maltreatment or a mental disorder does not inherently mean an individual is experiencing thwarted belongingness or perceived burdensomeness, but the theory suggests that these experiences can contribute to these feelings over time.[63] According to the IPTS, individuals who have experienced maltreatment or mental illness may become more likely to feel isolated or like a burden to others.[63] Therefore, it is proposed that these two perceptions that are central to the IPTS, may significantly increase the risk of suicidal thoughts and behaviours.[48]

Researchers have proposed that the association between suicidal ideation and attempts with childhood maltreatment may be due to early exposure to violence reducing an individual's threshold for self-harm.[126] A study conducted in Canada using a large population-based sample aimed to examine the association between specific ACEs and lifetime suicide attempts among adults.[17] The results showed that attempts were significantly more likely among those who reported childhood physical abuse, childhood sexual abuse, or exposure to parental domestic violence.[17] When adjusting for multiple ACEs, these associations remained significantly elevated. The odds of ever attempting suicide were more than three times higher for childhood physical abuse (OR=3.29; 99.9% CI [2.33, 4.64]), more than four times higher for childhood sexual abuse (OR = 4.42; 99.9% CI [3.14, 6.23]), and more than twice as high for exposure to parental domestic violence (OR = 2.52; 99.9% CI [1.69, 3.76]).[17] These findings suggest a strong association between specific adverse childhood experiences with increased suicide risk in adulthood. Another Canadian study utilized the 2012 CCHS to examine the association between child abuse and mental health conditions such as mental disorders, suicidal ideation, and suicide attempts.[16] Similar to the previous study discussed, the researchers examined the experience of physical abuse, sexual abuse, and intimate partner violence. They found that the prevalence of experiencing any of these three abuse types was 32.1% for the sample.[16] The most common type of abuse experienced was physical abuse (26.1%), then sexual abuse (10.1%), and lastly exposure to intimate partner violence (7.9%).[16] For sex specific findings, females were more likely than males to report having experienced sexual abuse and exposure to intimate partner violence, while males were more likely to report physical abuse and overall child abuse.[16] After adjusting for sociodemographic factors, all types of child abuse were associated with higher odds of developing any of the mental health conditions.[16] The authors also noted a dose response

relationship between the increasing number of child abuse types with greater odds of experiencing mental health conditions.[16] In a later Canadian study, data was analyzed from the 2018 Survey of Safety in Public and Private Spaces which collects retrospective reports from individuals aged 15 years or older across all provinces and territories.[35] Data from this study showed that 58% of individuals reported experiencing at least one type of non-physical child maltreatment, with 32.3% experiencing only non-physical maltreatment and 23.3% experiencing both physical and non-physical forms.[35] Interpersonal aggression, and emotional abuse were the most prevalent forms of childhood maltreatment reported, followed by emotional neglect, exposure to physical intimate partner violence, and physical neglect.[35] Those individuals who were exposed to any form of non-physical child maltreatment were significantly more likely to report suicidal ideation compared to those who were not.[35] Physical types of child maltreatment were also strongly associated with suicidal behaviours and mental disorders.[35] Overall, the findings indicate there have been associations found in the past between childhood abuse or maltreatment with suicidal thoughts and behaviours among Canadians.

Studies examining the association between childhood maltreatment, or abuse, with suicidality often utilize adult samples. It is also beneficial to utilize adolescent samples to analyze this association as it could reduce recall bias and can also allow for early interventions to address more immediate impacts for youth. A study conducted using data from the National Comorbidity Survey: Adolescent Supplement, aimed to analyze the association between the age at the first exposure to child maltreatment to suicidal ideation, plans, or attempts.[22] The researchers analyzed adolescents aged 13-18 in the United States, and examined time periods of 0 to 5, 6 to 10, and 11 to 18 for the age of onset of abuse.[22] The results of this study showed that sexual abuse prevalence was more common than physical abuse, and it was more likely to be

reported by females and older adolescents.[22] For physical abuse it was more common among older adolescents, and those who lived in metropolitan areas.[22] The exposure of sexual or physical abuse was associated with an increase in the odds of suicidal ideation, plans, and attempts compared to those who were not exposed for all time periods.[22] The age at which the experience of childhood maltreatment occurred was not associated with suicidal behavior.[22] Another study in the United States used a population-based case control study with adolescents aged 15-19 who died by suicide between 2010 and 2017.[23] This study was retrospective and examined whether specific characteristics of child maltreatment allegations and child protective services (CPS) involvement were associated with an increased risk of suicide.[23] The study focused on youth with a history of at least one CPS allegation, and the adolescent cases were matched with living controls by sex, race, and age.[23] The researchers used linked death and CPS records to analyze maltreatment types, substantiations, foster placements, and time since last CPS contact. The adolescents who died by suicide were more likely to have histories of physical abuse, sexual abuse, substantiated allegations, and more recent CPS involvement.[23] The researchers used regression analysis and revealed that youth reported for physical abuse had 60% greater odds of suicide compared to the controls, and for girls with sexual abuse allegations there was a 2.7 times greater odds of suicide compared to the controls.[23] Within a similar time period, a study used a nationally representative survey of youth aged 10-17 in the United States to examine the associations between past-year maltreatment and recent suicidal ideation, and self-harm, while also analyzing how these associations differ by sex.[21] The results showed that about 8.4% of youth reported suicidal ideation or thoughts of self-harm in the past month, with higher rates among older youth and females.[21] There were four types of maltreatment included in the study, and they were physical abuse, emotional abuse, neglect, and witnessing family violence.

All four types were significantly associated with an elevated risk of suicidal ideation, and emotional abuse showed the strongest association even when controlling for the other types.[21] There was also a dose-response pattern observed where youth who were exposed to multiple maltreatment types were more likely to report suicidal ideation or thoughts of self-harm, with the odds increasing from 3.4 for one type to 8.5 for three or more types.[21] Sex was found to be an effect modifier, and it moderated the effects of emotional abuse, as exposed females were over six times more likely than unexposed females to report suicidal ideation or thoughts of self-harm. For males, those who experienced emotional abuse were about twice as likely to report suicidal ideation or thoughts of self-harm than those unexposed.[21] These studies all infer an association between the experience of childhood maltreatment or abuse with suicidality. It is important to develop targeted interventions to contribute to suicide prevention efforts, especially for vulnerable populations like youth.

The Minority Disparity

Childhood trauma, abuse, and high ACE scores among both racialized and individuals belonging to sexual identity minorities have been identified as being associated with suicide.[25,28-30] Adverse childhood experiences can be understood as traumatic events such as maltreatment, neglect, and abuse that may lead to negative effects on the health and wellbeing of someone.[127] Childhood maltreatment is a precursor for suicidality among any group, however, it disproportionately affects members of minority groups. The literature is dominated by reports of ACE scores rather than being specific to abuse or childhood maltreatment, but the research shows minorities as being more susceptible to this exposure.

Research by Andersen and Blosnich[25] suggested that a history of childhood maltreatment was prevalent among members of the LGBTQ+ community. This is dated information, but more

recent literature reveals similar findings. There are many Western studies analyzing experiences of young LGBTQ+ adults and they report sexual minorities experience a higher exposure to ACEs than non-minority groups.[28,29] ACEs among LGBTQ+ populations have been reported more than heterosexuals, and they were more likely to report other childhood trauma such as abuse and household dysfunction.[25,30] Studies have been conducted in Canada indicating the increased likelihood of experiencing childhood maltreatment for individuals belonging to sexual identity minority groups. A Canadian study used data from the Well-Being and Experiences Study that followed participants from ages 14 to 17 in the first wave of the survey to ages 18-23 by wave five. The aim of this study was to examine how childhood maltreatment and sexual identity are associated with mental health outcomes.[128] The results showed that those identifying with a non-heterosexual sexual identity had an increased likelihood of experiencing all five maltreatment types (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect, and exposure to intimate partner violence) compared to their heterosexual peers with adjusted odds ratios ranging from 1.98 to 3.33.[128] Important takeaways from this study are that although the study was not nationally representative, it highlights the implications that child maltreatment has on sexual identity minority groups in Canada.[128] Diaz-Faes et al[27] conducted a survey among undergraduate students to assess ACE scores and suicide risk. They reported that those identifying as belonging to a sexual minority showed significantly higher scores (M = 2.70) than their heterosexual counterparts (M = 1.85) supporting other findings.[27] There was a higher rate and likelihood of a suicide attempt among LGBTQ+ individuals, attempting suicide almost three times more than heterosexual individuals.[27] Some studies have examined the associations between specific types of abuse or maltreatment with suicidality among sexual identity minorities. A study conducted in the United States used face-to-face interviews with a

nationally representative sample of adults to examine the prevalence and associations of childhood sexual abuse with suicide attempts, substance use, and mental health disorders by sex and sexual orientation.[129] This study found that among females, of those who identified as bisexual, 30.6% reported having experienced two or more types of childhood sexual abuse compared to 17.8% who identified as lesbian and 9.8% who identified as heterosexual.[129] Bisexual females also had the highest prevalence of suicide attempts, substance use disorders, and mental health conditions.[129] For males, those identifying as bisexual similarly reported multiple childhood sexual abuse experiences, higher rates of suicide attempts, substance use disorders, and mental health conditions.[129] The number of childhood sexual abuse types was found to be strongly associated with increased odds of mental health disorders, post-traumatic stress disorder (PTSD), suicide attempts, and substance use disorders, regardless of sex.[129] After controlling for other adverse childhood experiences, these associations remained significant.[129]

The research surrounding racial minorities is similar. Various contexts of an individual such as socioeconomic status, employment, and education level can contribute to the experience of ACEs. As noted previously, minorities take on these potential difficulties as well as other stressors.[109] A study by Giano et al[26] found that although most participants reported at least one ACE, multiracial individuals had significantly higher ACE mean scores than all other ethnicities. Individuals identifying as White had significantly lower mean ACE scores than those identifying as Black or Hispanic.[26] There are major disparities between racial groups when it comes to adverse experiences in childhood. With ACEs being well-documented as a risk factor for suicide, childhood abuse or maltreatment is likely quite influential to minority suicide.[130,131]

Research has been conducted in the United States and Canada indicating a higher risk of maltreatment for racial minority groups compared to White populations. For example, a

systematic review examining both Canadian and United States literature report on the significant overrepresentation of Black youth in the child welfare system, and they suggest this may be due to Black youth having a higher likelihood of being exposed to risk factors associated with maltreatment.[132] An individual research study that was conducted across the United States supports these findings. The authors examined racial disparities in reports of child maltreatment for youth 17 and under.[133] They utilized a "disparity ratio" to quantify over or underrepresentation of racial groups when it comes to maltreatment compared to White youth.[133] The disparity ratio scale categorizes underrepresentation as a number from 0 to 0.9, equal representation as 0.91 to 1.2, overrepresentation as 1.21 to 2.0, and high overrepresentation as anything over 2.01.[133] The results showed that across all states, except Tennessee, racial minority youth were generally overrepresented in child maltreatment reports. Black children were the most overrepresented group for all types of maltreatment including sexual, physical, and emotional abuse.[133] In Washington D.C., a finding that stood out was a disparity ratio of 15.1 for physical abuse, and 12.77 for sexual abuse for Black youth compared to White populations.[133] Other minority groups such as Latinx, Native North American, Pacific Islander, and multiracial youth had varying representation based on the state and type of abuse.[133] Asian American youth were one minority group that were consistently shown to be underrepresented or underreported in terms of maltreatment.[133] The researchers suggested that the low disparity ratios among Asian populations could be due to a variety of factors such as underreporting within the community due to cultural norms, stigma surrounding the issues, or biased perceptions of Asian minorities as the "model minority".[133] Another study conducted in the United States reports similar results. This study used a sample of adults 18 years or older, and data from a wave in a longitudinal study collected between 2004 to 2005.[31] The researchers gathered data on ACEs, socioeconomic status,

and other demographic variables among White, Black, Asian, Hispanic, and Native American individuals.[31] The results showed that Native American individuals had the highest number of ACEs reported, which were significantly more than any other racial group.[31] Black individuals reported the next highest number, followed by Hispanic, White, and similarly to the last article discussed, Asian Americans had the fewest ACEs reported.[31] When they analyzed the type of ACEs experienced by each group, Native Americans had the greatest prevalence of all maltreatment types including physical abuse, emotional abuse, sexual abuse, physical and emotional neglect, exposure to violence, and parental issues such as substance abuse, incarceration, and mental illness.[31] Overall, they experienced the highest prevalence of all types of maltreatment across all racial groups, however these differences were statistically significant for physical abuse, sexual abuse, witnessing violence, and parental substance abuse.[31] The findings from this study highlight the significant racial disparities when it comes to adverse childhood experiences. While this research was based on a United States sample, given the historical evidence of abuse and maltreatment of Indigenous peoples and children in Canada, these patterns likely reign true in Canada as well.[14]

Research in Canada, supports these findings. A study based in the province of Ontario used the Ontario Incidence Study data from 2013 to examine rates of overrepresentation of First Nations children involved in child welfare investigations.[134] The sample of participants included children under the age of 15 who were involved in investigations due to maltreatment concerns.[134] The results showed that at the time (2013), First Nation children made up just 2.5% of the child population, but they accounted for 7.4% of all maltreatment related investigations. To put these numbers into perspective, this indicates that they were involved in maltreatment investigations at a rate almost three times higher than their population size.[134] This also means

that for every 1000 First Nations children, about 160 were involved in child welfare investigations compared to 54 per 1000 White children.[134] When analyzing the reasons for investigations, for First Nations children, neglect and exposure to intimate partner violence were the most common, however, these children were more likely to be investigated across all maltreatment categories compared to White children.[134] The outcomes of these investigations were also quite severe for First Nations children. They were 4.2 times more likely to be transferred to ongoing services, 5.7 times more likely to be involved in child welfare court proceedings, and 7.5 times more likely to be placed in out-of-home care compared to White children.[134] Findings such as this point to systemic disparities of maltreatment endured by Indigenous populations in Canada. Examining other racial minority groups in Canada, a longitudinal study conducted in the province of Quebec aimed to determine the level of representation and disparity in receiving child protective services among Anglophone Black children from 2002 to 2013.[135] The findings from this study revealed that Black children faced notable disparities compared to White children. They were more likely to have their cases investigated further, to have a court case, and more often placed in out-of-home care.[135] Additionally, they were more likely to have their cases closed after receiving services, but they also experienced higher rates of maltreatment recurrence within a year of closure.[135]

2.7 Minority Mental Health and Suicide

Through the theory of minority stress framework, individuals belonging to minority groups are often subject to more societal discrimination. Unfortunately this may predispose them to elevated rates of mental health conditions.[136] Research suggests that across sexes of both males and females that belong to sexual identity minorities, they are more likely to have a diagnosis of a mental health condition such as depression or anxiety compared to heterosexual

individuals.[33] A systematic review on the mental health of individuals belonging to sexual identity minorities has revealed that much research shows that these adolescents reported elevated levels of depression, anxiety, bipolar disorder, and consequently, suicide attempts.[34]

There is a lack of evidence in the literature that has similar findings for racialized minorities, which may reflect systemic disparities rather than true differences in prevalence.[137] Many studies have reported that racialized minorities have significantly lower odds of documented mental health problems, treatments or diagnoses.[10,138] For example, compared to White youth who died by suicide, racial minorities such as American Indian, Alaska Native, Asian, Native Hawaiian, Pacific Islander, and Black youth had significantly lower odds of having a mental health diagnosis.[85] Research also indicates they have significantly less suicidal ideation, but are more likely to report an attempt.[15] The discrepancy between lower suicidal ideation and higher attempts among racial minorities could suggest the presence of barriers preventing mental health support in these populations.

Although the frequency of mental health condition diagnoses are often lower among racialized minorities, studies suggest when conditions such as depression are present among Black Americans, they tend to be more chronic and severe.[139,140] Additionally, widely used tools for depression and anxiety have rarely been validated with large samples of Black participants, which could result in underdiagnosis or misdiagnosis.[141,142] Research has also shown that in populations of Black youth, internalizing symptoms such as depression may present as irritability, anger, aggression, or even somatic complaints which often overlap with externalizing symptoms therefore being classified as behavioural issues rather than emotional distress.[143-145] The issues of diagnosing conditions in minority populations may be linked to environmental and social factors. In a case-control study conducted on Chinese youth and young adults, an

association was found between feeling disadvantaged compared to others (which they called relative deprivation) and suicide risk.[146] This association was explained due to the mediating effect depression has on the pathway from relative deprivation to suicidal thoughts and behaviours.[146] This pathway could be relevant to racialized minorities in Western societies, as they may also experience inequality, exclusion, and therefore develop a perception of disadvantage which could contribute to depressive symptoms and consequently suicide risk. Given the interplay of institutional racism, the experiences of chronic discrimination, and the lack of access to the appropriate resources among other inequities, this may underscore the environmental and social determinants of mental health disorders for racialized minorities especially for youth.[137]

Mental Health Care Access and Stigma

With the research indicating racialized minorities are less likely to report receiving mental health services when suicidality remains high in these populations, there are inconsistencies that must be addressed.[15] Studies have revealed that racialized minorities often report they do not know where to go for services, that they were in fear of others knowing they needed care, or that they were able to handle it without treatment.[15] Institutional racism also plays a role here with racialized individuals not feeling comfortable seeking help from someone who may be under qualified to serve racialized communities.[118,119] For many racialized minority groups there is a stigma associated with mental health and accessing care. It may be viewed negatively because it means sharing problems to individuals outside of the family, and for some groups this may be considered inappropriate.[147,148] In Canada, there was a study conducted in Ontario pertaining to ethnic differences in reports of mental health status and service utilization.[149] Chinese participants had the poorest mental-health and usage of services per their

self-report compared to all other ethnic groups.[149] The percentage of non-White ethnic groups that reported poor mental health or suicidal thought also had a very low rate of seeking help.[149] White respondents were significantly more likely than any other group to utilize mental health services.[149] An interesting finding that comes out of this study was the higher than expected rate of Black individuals that reported positive mental health. The authors do suggest that the racial diversity in Ontario may contribute to this finding, suggesting that the more racialized groups there are in a population, the more likely individuals are to feel a sense of belonging which contributes positively to mental health status.[149] Although the literature tends to suggest racialized minorities as having lower rates of mental health disorders, or service utilization, other factors such as institutional racism, and family beliefs and values should be considered before drawing concrete conclusions. For youth this may be especially important as parental consent may be required to receive services, or they may be even less educated on where to access the services they need. More research needs to be done to better understand how mental health and racialized minorities interact.

2.8 Mental health and Suicidality Protective Factors for Youth

It is important to identify the protective factors against suicide to inform effective prevention efforts. This is especially important for populations more at risk, such as youth and minority youth. Among Black adolescents for example, protective factors have been identified that have shown to support their mental health and reduce the risk of outcomes such as suicide.[114] One protective factor that has shown to have a crucial role for Black youth is family support. Family support includes consistent involvement from parents, which has been linked to less behavioural and emotional issues.[114,150] Racial and ethnic socialization has been discussed as another important protective factor for these youth.[114] Studies have reported that consistent

maternal communication that emphasizes cultural pride and racial identity reduces aggressive behaviour and depression, and acts as a support for youth from the effects of violence exposure.[151] Racial socialization which involves teachings of culture, preparation to face discrimination, and fostering a positive racial identity, provides youth with effective coping strategies.[152] When this communication and trust exists between mothers and children (particularly boys), cultural awareness of discrimination is associated with lower depression levels.[153] Supportive relationships outside of just parents, such as with friends, teachers, and other caring adults has also shown to serve as an important protective factor for Black youth.[114] Another protective factor for these youth is participation in out-of-school programs which have shown to reduce behavioural and mental health challenges, particularly in high-risk communities.[154,155] Gaining an understanding of these protective factors is important when addressing serious mental health outcomes such as suicide. Building onto the information above, a study explored the association between parental support and involvement on suicidal behaviour among Black youth aged 12 to 17 with depressive symptoms.[156] The researchers used data from 2004 to 2019 and found that a lack of parental support, including a lack of expressing pride in their children, not helping with homework, or frequent conflict with their child was associated with significantly increased odds of suicidality. Additionally, youth that reported not having anyone to confide in about serious problems were at a higher risk as well.[156] However, strong parental relationships with less conflict and greater emotional and academic support showed protective effects for Black youth in this study.[156]

While parental involvement, support, and cultural identity are identified protective factors for Black youth, similar themes emerge for research involving Indigenous youth and young adults. One study focusing on Indigenous young adults from eight reserves across the upper

Midwest United States and Canada found that engagement with their culture, which they define as enculturation, was a significant protective factor for mental health.[157] The participants in this study reported that greater enculturation led to stronger cultural efficacy, meaning they felt more confident navigating cultural settings, centering culture in their roles, and seeking cultural knowledge. This sense of purpose and identity contributed to a stronger sense of belonging, which can be protective against mental health challenges.[63,157] Another study utilized undergraduate Native American and Alaska Native students to examine the psychological impact of historical loss, or intergenerational trauma resulting from colonization.[158] The researchers report that having an increased awareness or experience of historical loss was associated with lower well-being and greater psychological distress. However, the study found that "ethnic identity", defined as feeling proud of and connected to their Indigenous identity, was associated with a greater ability to cope with the psychological effects of historical loss, suggesting that cultural identity serves as a protective factor.[158] In a broader scope, a scoping review of suicide prevention strategies for Indigenous peoples across Australia, the United States, Canada, and New Zealand also emphasized connection to culture as a fundamental and effective suicide prevention effort.[159] Many of the articles in the review reported that suicide prevention efforts for Indigenous populations often drew on Indigenous knowledge systems to define the issue of suicide and guide the development of culturally appropriate, community driven initiatives.[159] The common identified strategies for prevention were using culture as treatment, which means using cultural engagement to mitigate suicide risk, community-based prevention programs that are focused on resilience and empowerment, gatekeeper training to teach community members how to identify and support those at risk, and educational initiatives that increase suicide awareness and protective skills.[159] An important theme that emerged was the employment of decolonial

approaches in suicide prevention for this population. These approaches intentionally move away from Western models of suicide prevention, and this was central in many of the articles.[159] Lastly, a longitudinal cohort study conducted in Australia identified several protective factors against self-harm and suicidality among Indigenous adolescents.[160] The researchers found that boys were less likely to report self-harm, indicating male sex as a protective factor although there are other factors likely also contributing to this finding and how males report sucidality.[160] Other protective factors included stronger family cohesion, and higher scores on the Strengths and Difficulties Questionnaire (SDQ) pro-social subscale, indicating stronger social and emotional functioning.[160] These studies all show the importance of cultural identity, family and community support and culturally grounded approaches in supporting the mental health and reducing suicide risk for Black and Indigenous racial minority youth.

Sexual identity minority youth also experience disproportionately high rates of mental health issues, such as depression, anxiety, and suicidality, compared to their heterosexual peers.[161] Research from Canada indicates that some contributing factors to this disparity includes lower levels of social support and access to health care, which have shown to be protective against mental health issues when they are available.[105] A longitudinal study from the United States followed sexual minority youth from adolescence to adulthood, and reported that those with positive coping skills, good self-esteem, emotional well-being, and the expectation of living past 35 years old had significantly lower poor mental health outcomes in young adulthood.[161] They also found that for every five-unit increase in self-esteem was associated with a 21% decrease in the odds of poor mental health.[161] Family connectedness was another protective factor identified, and it was significantly associated with 18% lower odds of negative mental health outcomes for sexual minority youth even after adjusting for confounders.[161] Besides

family protective factors, school-based protective factors for these youth have also been identified. Sexual minority youth who felt connected to their school, participated in school sports, or viewed their teachers as caring, reported less mental health issues over time. When adjusting for confounders this association remained significant for school connectedness and caring teachers.[161] Evidence from another longitudinal study supports these findings, which found that access to trusted adults was associated with decreased suicidal ideation for sexual identity minority youth, but also for heterosexual youth.[162] In terms of access to care and community support, a study has reported that sexual and gender minority populations with perceptions of high social support had significantly lower rates of suicidal ideation compared to those with lower levels of social support.[105] Similarly, receiving health care when it was needed was associated with lower rates in suicidal ideation as well.[105] Other articles report that access to counseling was specifically associated with lower suicidal ideation among sexual minority students, which emphasizes the importance of accessible mental health services for this group.[162]

It is important to be aware of group specific protective factors to guide appropriate interventions, but other studies that did not focus on minority groups have reported findings for protective factors as well. A study conducted in Montreal, Quebec, Canada aimed to examine how risk and protective factors influenced depression and suicidal behaviour in adolescents from both community and clinical populations.[163] The community sample was composed of 14 to 17 year olds, and data was collected from November 2006 to May 2007.[163] The clinical sample consisted of adolescents 13 to 17 years old who were evaluated at the Mood Disorder Clinic which specializes in treating youths with depression or bipolar disorders and associated suicidal behaviour.[163] Some protective factors for all youth in the study included self-discovery or

understanding oneself better, which was especially protective in the community group. Focusing on positive and productive coping strategies which involves problem solving and working hard to achieve what they wanted was also protective particularly for girls.[163] In the clinical group, peer acceptance, and support was a strong protective factor especially among the boys. Across both groups, having reasons for living such as for family and future optimism were protective factors as well.[163] Overall, these protective factors were associated with reduced depression and suicidal behaviour in these adolescents.

2.9 Conclusion

Suicide is a continued leading cause of death around the world including in Canada, and protecting those most vulnerable to it should be a priority. However, if we are unable to understand the common factors associated with suicidality, it makes it difficult to take any preventative action. Understanding if and why youth minorities in Canada are subject to more suicidality, and how the experience(s) of childhood maltreatment plays a role are important building block for preventing youth suicide in the future. With this research, targeted preventative measures can be developed, and other factors can continue to be explored in these populations at risk. Overall, youth are the individuals that will shape the future. To gain an understanding of what puts them at risk for adverse outcomes in this country will help us better protect them going forward. This research will be one of the first studies that will provide us with an understanding of the situation regarding minority youth in Canada and contribute to research on the consequences of childhood maltreatment.

CHAPTER 3: CHILDHOOD MALTREATMENT AS A PREDICTOR OF SUICIDALITY IN CANADIAN YOUTH (PAPER 1)

Abstract

Background: Suicide is a major public health concern worldwide, with youth being particularly vulnerable. Childhood maltreatment has shown to be one factor that increases the likelihood of suicidality in youth. Mental health may be a key mediator for this association. In this study, the association between the severity of childhood maltreatment and suicidality in Canadian youth aged 18 to 29 was examined.

Methods: Data from the *Mental Health and Access to Care Survey* (MHACS) was used to examine the research questions. All models were conducted with weighted bootstrapped data, to ensure appropriate national representation. Population estimates were reported, and logistic regression models were built, while mediation analysis was conducted according to the Baron and Kenny (1986) approach using logistic regression.

Results: Childhood maltreatment was associated with an increased likelihood of suicidality. A dose-response pattern was observed, where the likelihood of suicidality increased with the number of childhood maltreatment types experienced. The mediation analysis revealed that this association may be partially explained by depression and anxiety.

Discussion: This study contributes to past research by providing more recent data on this topic in a Canadian context. Previous literature suggests an association between childhood maltreatment and suicidality which this study supports. A younger sample was utilized providing new insight into this association among young people in Canada. There are many contributors to suicide, however childhood maltreatment has shown to be an important factor to consider.

Conclusion: These findings emphasize the importance of developing evidence-based policies and ensuring accessible mental health support for youth exposed to childhood maltreatment. Addressing this vulnerable group is important for prevention and reduction of suicidality while improving overall public health outcomes in Canada.

Introduction

Background

Suicide constitutes a major public health concern and remains one of the leading causes of death worldwide.[2] The World Health Organization (WHO) reported globally in 2019 that more than one in every 100 deaths were the result of suicide.[1] National longitudinal data from the United States examining a population sample of individuals over the age of 18 from 2008 to 2019 found that suicidal ideation increased from 3.7% to 4.8%, and the prevalence of having a suicide plan increased from 1.0% to 1.4%.[5] While these findings are concerning for adults, research also indicates that suicidal ideation tends to increase between the ages of 12 to 17, and suicide death becomes increasingly common by 15 to 19 years old placing youth at a high risk.[77-79] Supporting evidence has found adolescents who experience suicidal ideation are approximately 12 times more likely to attempt suicide by age 30 compared to those who do not.[81]

The WHO stated in 2021 within youth aged 15 to 29, self-harm (indicating suicide) was one of the top two causes of death.[1] Globally, suicide among these groups, accounts for about 8.5% of all deaths.[1] Looking at Canada specifically, as of 2023 suicide was the second leading cause of death for youth aged 15 to 29 indicating suicide as a relevant concern to be studied in youth populations.[3] Additionally, using longitudinal population data from the Canadian Community Health Survey (CCHS), a study found that for participants aged 15 to 24 the prevalence of suicidal thoughts increased from 14.1% in 2012 to 18.1% by 2022.[4] Other research using the CCHS found with a sample of 12 to 24 year olds from 2011 to 2016, suicidality as a whole (including ideation, having a plan, or making an attempt) increased from 3.0% to 5.8%.[82] Another study utilizing a birth cohort from Quebec, Canada reported on the prevalence of

suicidality and other mental health outcomes correlated with these behaviours in adolescents from the age of 13 to 20.[32] The prevalence of suicidal ideation increased throughout adolescence, whereas the prevalence of attempts stayed constant.[32] These results indicated that by age 20, about 9.8% of adolescents experienced serious suicidal ideation, and about 6.7% had attempted suicide.[32] It was noted that those presenting with depressive symptoms may be at an additional risk for suicidal ideation or a suicide attempt.[32]

Rates of suicidality can differ depending on sex as well. The WHO reported in 2019 that the suicide death rate for males was higher than for females across the globe, with the age-standardized rate being 2.3 times higher.[2] In some countries, the highest rates for females were above 10 per 100,000, but for males there were some above 45 per 100,000.[2] While males have shown higher lethal suicide rates, females tend to show higher rates of suicidal ideation. In Canada, CCHS data from 2012 to 2022 found for men, which are categorized as "Men+" to include some individuals who identified as non-binary as well as those who identified as male, had lifetime suicidal thoughts increase from 12.0% to 14.2%.[4] For females, categorized as "Women+", had higher percentages with 16.2% in 2012 to 22.2% in 2022.[4]

Youth Mental Health

In youth, mental health conditions such as depression or anxiety are strong risk factors for suicidality.[32] Particularly, in developmental stages of youth when many changes socially, developmentally, and emotionally are occurring, aspects of suicide such as ideation significantly increase.[32] A research study using data from the CCHS between 2011 to 2018 reported a rise in prevalence of mental health concerns, diagnoses, and healthcare consultations among youth aged 12 to 24.[82] During this time, the proportion of youth with poor or fair mental health increased from 4.2% to 9.9%. The diagnosis of mood disorders increased from 4.3% to 7.8%, and anxiety

disorders rose from 6.0% to 12.9%. The prevalence of youth that consulted a mental health professional in the past year increased from 11.7% to 17.0%.[82] Similar trends in mental health status were shown in a cohort study examining the impact of COVID-19 on first year undergraduate students.[83] The researcher's obtained results of mental health status changes even before the pandemic from students in the cohorts entering in 2018 and 2019. During this time, there were noticeable increases in mental health symptoms of depression, anxiety, and insomnia.[83]

From the study utilizing the 2011 to 2018 CCHS data, some sex specific findings were reported.[82] The researchers found that the change in prevalence of poor mental health was the most significant for young adult females aged 19 to 24 changing from 5.4% to 15.6%. Adolescent females aged 12 to 18 also had a large increase in prevalence from 3.8% to 9.5%.[82] Males for both groups exhibited changes as well but the changes were not as large. For young adult males the prevalence of poor mental health increased from 4.8% in 2011 to 9.4% in 2018. For male adolescents the change was 2.7% to 5.5%.[82] Given the information above, mental health conditions, as well as sex or gender are important factors to consider when examining suicidality in youth and young people.

Childhood Maltreatment and Suicide

The WHO defines childhood maltreatment as an act that promotes damage to the health, development, or dignity of a child.[40] Childhood maltreatment may involve being neglected, a witness of domestic violence, or experiencing emotional, physical, or sexual abuse.[16,40] Research in Canada highlights childhood maltreatment as a national public health concern.[16] Early studies reported that approximately 32% of Canadians experienced some form of childhood maltreatment, while more recent data from 2018 indicated that around 60% of the

population had reported an encounter of maltreatment before the age of 15.[16,35] Of the respondents who reported maltreatment, around 23% of them reported both physical and non-physical forms of abuse.[35] These findings reinforce the widespread issue of childhood maltreatment within Canada. These studies suggest there are important sex differences when it comes to maltreatment with females being more likely to report encounters of sexual abuse and witnessing domestic violence, while males were more likely to experience physical abuse with an overall higher likelihood of reporting maltreatment in general.[16] Additionally, research shows that childhood maltreatment is associated with future mental health issues including suicidality. Studies have reported that among respondents with suicidal ideation within the past year, 62% of them reported encounters of childhood abuse.[24] Additionally, exposure to any kind of maltreatment has shown to be associated with significantly increased odds of suicidal behaviours and mental health disorders.[35]

Existing literature regarding childhood maltreatment often focuses on measures such as adverse childhood experience (ACE) scores to examine abuse, rather than analyzing the specific elements (types) of childhood maltreatment. Some studies have targeted more specific ACE categories; however, the use of more recent data will support these findings. In a Canadian study using a large population-based sample of adults, the association between specific ACEs and lifetime suicide attempts was examined.[17] Participants who reported experiencing childhood physical abuse, sexual abuse, or exposure to parental domestic violence were significantly more likely to have had a suicide attempt. These associations remained elevated even after adjusting for multiple ACEs. The odds of attempting suicide were over three times higher for physical abuse, more than four times higher for sexual abuse, and over twice as high for exposure to

domestic violence.[17] These findings suggest a strong association between specific ACEs and an increased risk of suicide.

Another notable gap in the literature to be addressed is the limited use of youth and adolescent samples in research regarding childhood maltreatment and related outcomes. Many studies typically rely on adult populations, which often depend on retrospective data that is more susceptible to recall bias. While research involving youth samples likely also include retrospective elements, the shorter recall period may reduce the potential for remembering incorrectly. Studying younger populations also offers a better opportunity to identify risk factors earlier to inform timely intervention strategies. Some studies have taken place in the United States with youth samples, although updated research is needed. One study used national survey data and a sample of youth aged 13 to 18 to examine the association between age at first exposure to maltreatment (using ages 0-5, 6-10, and 11-18) and suicidality outcomes.[22] The researchers reported no significant associations between age of exposure with suicidality, however, having the experience of sexual and physical abuse at any time significantly increased the odds of suicidality.[22] A later case-control study in the United States used Child Protective Services (CPS) data and death records from 2010 to 2017 to identify adolescents aged 15 to 19 who died by suicide and matched them with living controls to examine differences in maltreatment experiences.[23] For those youth that died by suicide, they were more likely to have had a history of sexual or physical abuse, substantiated CPS reports (which include evidence that the maltreatment reported did occur), and they had recent CPS involvement. Those who experienced physical abuse had 60% higher odds of suicide, and girls who experienced sexual abuse had 2.7 times higher odds of suicide.[23] Lastly, another study in the United States used youth to longitudinally examine the association between past year maltreatment and suicidal

ideation or self-harm.[21] They examined four types of maltreatment including emotional abuse, physical abuse, exposure to intimate partner violence, and neglect. Emotional abuse showed the strongest association with suicidality although all four types were associated with increased suicidality.[21] A dose response effect was observed here where the more types of maltreatment that were reported, the higher the odds were for suicidal ideation.[21] However, as stated previously more recent data is needed to support these findings, especially in the Canadian context.

Mediating Role of Mental Health

As mental health conditions have shown to follow experiences of childhood maltreatment, and they are often associated with suicidality, it is reasonable to postulate their mediating effect.[16,32,35,82] Mental health conditions such as depression and anxiety will be explored within this paper, and it is theorized based on the literature that they will have a mediating effect, as they are likely to lie on the pathway from childhood maltreatment to suicidality.

Theoretical Basis

The common theories of suicide often adopt an ideation to action framework, meaning a suicide attempt often begins with thoughts about suicide, development of a plan, and making an attempt. Proposed theories with this type of framework include the Interpersonal Theory of Suicide (IPTS) and the three-step theory (3ST). The IPTS states that people are able to die by suicide when they have the desire and capability to do so.[62,63] There are three central constructs in the IPTS that explain the pathway to suicide called thwarted belongingness, perceived burdensomeness, and acquired capability. Thwarted belongingness combines feelings of loneliness, and a lack of meaningful or reciprocal relationships with others. Perceived

burdensomeness involves feeling as though one is a burden to close others, and acquired capability means having the capacity to make an attempt.[62,63] The IPTS posits that the ideation for suicide arises when thwarted belongingness and perceived burdensomeness are present simultaneously, and an individual feels hopeless that their condition will improve. This is enough to create an active desire for suicide according to the theory. When this active desire is coupled with a low fear of death, it is enough to drive suicidal intent and form a plan. Lastly, when these feelings are combined with the means to make an attempt, an attempt is more likely to occur.[62,63] The 3ST is a more recently developed theory but has a similar framework to the IPTS that explains the pathway to suicide from ideation to an attempt. In the first step of the theory, it is stated that if an individual experiences feelings of psychological pain accompanied by hopelessness that things will improve, suicidal thoughts may arise.[67,68] The second step indicates that if pain and hopelessness outweighs an individual's connectedness, meaning to others, the community, or to any source of purpose, suicidal thoughts may change to a more active desire. In the third step, similar to the IPTS, if there is capability for suicide it is more likely an attempt will occur.[67,68]

These theories are applicable to understand the transition from childhood maltreatment to suicidality. Applying the IPTS does not inherently mean an individual will experience feelings of thwarted belongingness or perceived burdensomeness, but the theory suggests that these negative experiences in childhood could contribute to those feelings over time. Those who had experiences of maltreatment may become more likely to feel lonely, isolated, or like a burden to others.[63] Therefore, given that these reflect the central constructs of the IPTS, the risk of suicidality increases with them present. Using the 3ST, this association can be explained as well. Childhood maltreatment can create psychological pain and feelings of hopelessness in a child

who may perceive there is no way to improve their circumstances. This pain could continue into their developing years, or later into life as well. Under these conditions a child may not develop strong social bonds or relationships early on in life, opening the possibility for their psychological pain and hopelessness to overcome any sense of connectedness. This would contribute to an intense suicidal desire as indicated by the 3ST. Additionally with these experiences of maltreatment, a child could habituate to pain (both physical and emotional), develop a low fear for death, and therefore have the capability for suicide, indicating an attempt to be likely to occur.[67,68]

The Present Study

As youth are placed at an increased risk for mental health conditions, and suicide, exploring the contributing factors for this issue is important. Childhood maltreatment has previously shown high prevalence rates within Canada, connections with suicidality, and past research has demonstrated a possible dose-response association between these variables.[16,21,35] However, there are a lack of recent studies examining these factors, and specific maltreatment types on suicidality with samples of youth in Canada. Therefore, this study will examine the following research questions:

1. Is the severity of childhood maltreatment associated with a higher likelihood of suicidality among Canadian youth aged 18 to 29?
    a. Does meeting the criteria for depression or anxiety mediate the association between childhood maltreatment and suicidality?

Methods

Study Design

Data was obtained from the Statistics Canada 2022 Mental Health and Access to Care Survey (MHACS).[36] The MHACS was a repeat of the 2012 Canadian Community Health Survey on Mental Health, with the objective of assessing the mental health status of Canadians, the impact of the COVID-19 pandemic on population health, the access and utilization of mental health services, and the links between mental health and other factors.[36] The survey used a cross-sectional design, and the frame for the survey was the set of respondents from the 2021 long-form census. A stratified simple random sampling method was used to ensure adequate representation of all groups. The survey was designed to oversample those identifying as visible minorities so there was sufficient data to produce reliable estimates for these groups.[36]

This survey covered the Canadian population 15 years of age and over as of March 1, 2022, who were living in the 10 provinces. Those excluded from the survey were persons living on reserves or other Aboriginal settlements, full-time members of the Canadian Forces, and persons living in collective dwellings.[36] Participation in this survey was voluntary. This data was collected using a type of computer-assisted telephone interview called Internet-Based Electronic Questionnaires.[36] Using this method, interviews were conducted with a trained interviewer by telephone. The responses given by participants were captured directly by the interviewer for them to input using a computerized questionnaire.[36] The data was collected from March 17 to July 31, 2022, with a total of 9861 interviews conducted, and a 25% response rate.

Survey Weights. To ensure the data was representative of the covered population and not only the sample, survey weights were used. The survey weights applied correspond to the number of individuals in the total population that are represented by a respondent. Statistics Canada created

a weighting variable that accounts for the complexity of the sampling design, non-response, probability of selection, and known population totals.[36] The MHACS also used a generalized bootstrap methodology and generated 1,000 sets of bootstrap weights. In the present study to correct for the underestimated variance due to this bootstrap method, a scale factor of 1/9 was applied in a survey design object during analysis as per the requirements of the MHACS user documentation.[36]

Measures

Outcome variable: Suicidality. Suicidality encompasses a risk of suicide due to ideation, suicide intent, a deliberate plan, or a suicide attempt.[37] There was no specified validated scale used in the MHACS to measure suicidality. Rather, there were a range of question such as "Did you ever seriously think about taking your own life", "Did you ever make a plan for attempting suicide?", or "Have you ever attempted suicide or tried to take your own life?" eliciting either a 'Yes' or 'No' response.[36] Therefore, suicidality was identified as a self-report response to these questions. The MHACS states that these questions were chosen as indicators related to suicide based on their use in previous years of the CCHS.[36] Within this study the outcome variable was dichotomous, coding respondents who answered "Yes" to any of the previously mentioned questions as 1 = suicidality, and those who answered "No" to all of those questions as 0 = none.

Exposure variable: Childhood maltreatment. Childhood maltreatment is defined by the WHO as an act that promotes danger to the health, development, or dignity of a child.[40] The MHACS measures experiences of childhood maltreatment by asking questions regarding abusive or neglectful encounters participants were exposed to before the age of 16.[36] Only respondents over the age of 18 were prompted with these questions which covered six specific types of maltreatment involving being a witness of domestic violence and being physically or sexually

abused.[36] For each type of childhood maltreatment, the respondents were asked how many times they had experienced it on a scale from 1 = never, 2 = 1 to 2 times, 3 = 3 to 5 times, 4 = 6 to 10 times, or 5 = more than 10 times. The survey then utilizes these responses to identify how many types of maltreatment the participants experienced from zero up to six types.[36] For this paper the number of types of childhood maltreatment will be analyzed, to examine the effect of the cumulative impact of different kinds of maltreatment on suicidality. This will be analyzed by categorizing the abuse types into three groups where 0 = no maltreatment experienced, 1 = one to three types experienced, and 2 = four to six types experienced to indicate increasing severity to assess a potential dose-response association.

Mediating Variable: Mental health symptoms. In the MHACS respondents were prompted with a series of questions that were compiled to determine if they met the criteria for depression or anxiety. The criteria were determined in the survey based on the World Health Organization Composite International Diagnostic Interview-Short Form (CIDI-SF) screening tool which evaluates mental health disorders as per the diagnostic statistical manual (DSM).[41] The CIDI-SF is a beneficial tool for large-scale surveys where an in-depth assessment by a professional is not feasible.[42] The mental health symptoms of depression and anxiety will be analyzed and tested for mediation effects in this study. If respondents met the criteria for either condition based on the questions provided, they were categorized as 1 = mental health, if they did not meet the criteria for either condition they were categorized as 0 = no mental health.

Covariates. There are important potential confounders to consider for examining the association between childhood maltreatment and suicidality. As age was stratified to only include those between 18 to 29 years old, it was likely not necessary to include, but it was tested as a confounder in the analysis. Gender has a potential confounding effect in this association where it

has shown to alter the type of maltreatment experienced, and suicidality has shown to differ by sex.[15,16,46-48] Therefore, it was tested as a confounder during analysis. Lastly, ethnicity or 'race' has shown to increase the risk for suicide, and the risk of childhood maltreatment.[6,7,25,28-30,49,86] Therefore, visible minority status was included to be tested as a confounder during analysis as well.

Statistical Analysis

All analyses were conducted using the R Studio software[55] within the research data center at the University of Lethbridge. All models and descriptive statistics were analyzed using bootstrapped weighted data from the MHACS.[36] The data frame used for this analysis was created in R Studio with the variable's childhood maltreatment, suicidality, mental health conditions, age, gender, the final weight variable, and all bootstrapped weights included. Descriptive statistics were used to understand variable characteristics and their distribution within the subsample created. The frequencies for all variables were calculated using the survey package in R.[56] All missing data were handled using listwise deletion. Bootstrapped logistic regression models were also built using the survey package to calculate the odds ratios, and 95% confidence intervals with an alpha value of $\alpha = 0.05$ in both adjusted and unadjusted models. The models were fit with a quasibinomial family as initial binomial family fitted models produced a warning in R. Using the quasibinomial model allowed to account for potential overdispersion and obtain robust standard errors. Age, gender, and visible minority status were added to the regression models to test confounding effects. Age and visible minority did not meet all criteria for confounding and were not maintained in the final adjusted model. Gender met all confounding criteria and was therefore maintained in the final adjusted model. To test the potential mediation effects of mental health conditions, logistic regression models were built to

analyze this following the method proposed by Baron and Kenny.[57] Within this method, the total effect of the exposure childhood maltreatment on the outcome suicidality was tested in a model with gender added as it is a part of the final adjusted model. The next model tested the mediator path analyzing the effect of childhood maltreatment on the mediator variable mental health conditions. The last model involved adding mental health conditions to the model with all variables included to test the direct effect of the exposure on the outcome through the mediator, and the effect of the mediator on the outcome through the exposure variable.[57] Mediation was measured based on the changes to the odds ratio coefficient, and their significance at each step.

Ethics Approval

Ethics approval for this study was granted by the Research Ethics Board through the University of Alberta (Study ID: Pro00142299).

Results

Sample Characteristics

Estimates were weighted to represent the national population. The weighted demographic and clinical characteristics for the study sample (N = 4,716,677) are presented in Table 3.1. The sample was composed of individuals aged 18 to 29, that were 46% women+, with 34% identifying as visible minorities. For exposure to childhood maltreatment types, 62% reported having no exposure, 33% reported having low exposure or experiencing one to three types of maltreatment, and 5% reported a high exposure or experiencing four to six types. For the outcome, 11% reported past suicidality. There were 23% of the sample who met the criteria for the conditions of depression or anxiety.

Table 3-1. Population estimates

Characteristic	*N* (%)

Childhood maltreatment	
No exposure	2 930 299 (62)
Low exposure (1-3 types)	1 537 169 (33)
High exposure (4-6 types)	249 210 (5)
Suicidality	
Yes	498 030.2 (11)
No	4 218 647 (89)
Gender	
Men+	2 557 541 (54)
Women+	2 159 136 (46)
Visible minority	
Yes	1 591 281 (34)
No	3 125 396 (66)
Mental health criteria	
Yes	1 085 878 (23)
No	3 630 800 (77)
Age	
18-24	2 836 966 (60)
25-29	1 879 712 (40)

Weighted frequencies.

Suicidality by Childhood Maltreatment Exposure

Table 3.2 presents the weighted descriptive prevalence of suicidality by the different childhood maltreatment categories. Respondents with no exposure to childhood maltreatment showed the lowest prevalence of suicidality (~5%), followed by low exposure (~19%), and the highest prevalence was among those with high exposure to maltreatment (~26%). In the unadjusted logistic regression model compared to those with no exposure to maltreatment, those with low maltreatment exposure (1 to 3 types) were 4.52 times more likely to have a suicidality outcome (OR = 4.52; 95% CI: [2.79, 7.29]), and those with high maltreatment exposure (4 to 6

types) were 6.93 times more likely to have a suicidality outcome (OR = 6.93; 95% CI: [3.18, 15.10]) (Table 3.3). When adjusted for gender the pattern remained the same with respondents with low exposure to maltreatment being 4.82 times more likely to have a suicidality outcome (OR = 4.82; 95% CI: [2.97, 7.83]), and those with high exposure were 6.85 times more likely to have a suicidality outcome (OR = 6.85; 95% CI: [3.07, 15.31]). Compared to the women+ gender men+ were 40% less likely to have a suicidality outcome (OR = 0.60; 95% CI: [0.37, 0.95]) (Table 3).

Table 3-2. Weighted prevalence of suicidality by childhood maltreatment exposure

	Suicidality (%)	Non-suicidality (%)
No Maltreatment	143 278.28 (5)	2 787 020.55 (95)
Low Maltreatment	289 309.42 (19)	1 247 859.32 (81)
High Maltreatment	65 442.53 (26)	183 767.48 (74)

Weighted frequencies.

Table 3-3. Weighted bootstrapped logistic regression analysis for unadjusted and adjusted models

Variables	Unadj. OR (95% CI)	Adj. OR (95% CI)
Childhood maltreatment		
None	Reference (1.0)	Reference (1.0)
Low	4.52 (2.79, 7.29)	4.82 (2.97, 7.83)
High	6.93 (3.18, 15.10)	6.85 (3.07, 15.31)
Gender		
Woman+	Reference (1.0)	Reference (1.0)
Men+		0.60 (0.37, 0.95)

Adj. OR adjusted for gender.

Mediation

Table 3.4 shows the results of mediation using the Baron and Kenny[57] approach and logistic regression. The mediator mental health was tested in these models. The total effect of childhood maltreatment on suicidality, as described above, showed higher odds of suicidality for both low exposure to maltreatment (OR = 4.82; 95% CI: [2.97, 7.83]), and high exposure (OR = 6.85; 95% CI: [3.07, 15.31]) compared to those with no exposure. The mediator path was also tested to examine the association between childhood maltreatment on mental health. Childhood maltreatment was significantly associated with mental health, with those with low exposure being 2.23 times more likely to meet criteria for a mental health condition (OR = 2.23; 95% CI: [1.53, 3.25]), and with high exposure being 4.76 times more likely (OR = 4.76; 95% CI: [2.43,9.35]). When adjusting for the mediator to get the direct effect of childhood maltreatment on suicide, the effect was reduced but remained statistically significant for both low exposure (OR = 3.97; 95% CI: [2.41,6.54]), and high exposure (OR: 4.46; 95% CI: [1.95,10.18]). This pattern is consistent with partial mediation indicating that mental health might partially explain the association between childhood maltreatment and suicidality.

Table 3-4. Weighted bootstrapped mediation analysis

Effect	OR (95% CI)
Total effect[a]	
Low maltreatment	4.82 (2.97, 7.83)
High maltreatment	6.85 (3.07, 15.31)
Mediator path[b]	
Low maltreatment	2.23 (1.53, 3.25)
High maltreatment	4.76 (2.43, 9.35)
Direct effect[c]	
Low maltreatment	3.97 (2.41, 6.54)

High maltreatment	4.46 (1.95, 10.18)

[a] **Total effect**: Estimated from the model of childhood maltreatment on suicidality without the mediator
[b] **Mediator path**: Estimated from the model of childhood maltreatment on the mediator mental health
[c] **Direct effect**: Estimated from the model of childhood maltreatment with the mediator mental health on suicidality

Discussion

Using the data from the MHACS 2022, the association between childhood maltreatment and suicidality was examined. Results indicate experiences of childhood maltreatment significantly increases the odds of suicidality in youth aged 18 to 29. The prevalence of suicidality increased with the number of types of childhood maltreatment endured. The evidence suggests this association may be partially mediated by mental health conditions of depression or anxiety. The number of types of childhood maltreatment was examined and categorized as no exposure if no maltreatment occurred, low exposure if the respondents had one to three types they had experienced, and high exposure if it was four to six types. The observed associations obtained from the adjusted logistic regression models in Table 3.3 are substantial. Those who had low exposure were almost five times more likely to have a suicidality outcome compared to those without any experience of maltreatment. This was over six times more likely for those respondents with a high maltreatment exposure. These results suggest a considerable association between childhood maltreatment and suicidality, warranting public health attention in Canada. These results support past research that indicate an association between childhood maltreatment and suicidality.[16,24] The findings are supported by past research conducted in Canada regarding child abuse and mental disorders that state a high prevalence of the population (32%) had experienced childhood abuse and showed increased odds of suicidal ideation and attempts.[16] Additionally, this research found a dose-response pattern similar to the findings in the present study where more types of abuse were associated with increased odds of mental health conditions.[16] Studies in the United States report similar results from a national sample of youth

where an increasing number of childhood maltreatment types were associated with greater odds of suicidal behaviour.[21] It was found in the present study that individuals within the men+ gender category were less likely to have the outcome suicidality than those who were in the women+. Evidence regarding sex specific findings when it comes to suicidal outcomes find that males are typically more likely to attempt and die by suicide compared to females.[3,46-48,60,87,88] However, females often experience higher rates of ideation, or poorer mental health outcomes.[32,82,87,88] Explanations have been offered for this discrepancy indicating that females may have a lesser intent to die, use less lethal means then males, and have a higher chance of being saved based on their method of choice.[92-94,97] Given that men+ were found to be less likely to have the outcome suicidality in this study (Table 3.3), it is plausible that the combined measure of ideation, planning, and attempts, was influenced more heavily by ideation, which is typically more prevalent among females. Theories pertaining to why this may be the case may include men's lack of help seeking behaviour due to stigmatization or as a means of demonstrating their masculinity.[89,90] This could potentially have contributed to the observed decreased odds of suicidality in men+ compared to women+.

The present study contributes further to the literature by utilizing a younger sample within Canada to examine this association. Not many past research studies in Canada have utilized youth samples to analyze childhood maltreatment as a predictor of suicidality. Research in the United States has done so, leaving a gap in understanding the impact on the Canadian population.[21-23] Studies using adult samples are susceptible to recall bias. Although recall bias can still occur with younger participants due to a retrospective design, their recollection is likely more accurate given the incidents of childhood maltreatment were more recent. Additionally, younger samples present a greater opportunity for timely interventions to address suicidality

associated with childhood maltreatment. It is especially relevant to examine suicide in youth given that it is among the top two leading causes of death worldwide.[1] This study also provides more recent evidence regarding childhood maltreatment and suicidality in Canada given that most studies conducted in Canada on these topics are older.[16,35] Past research has focused on mental health conditions as the outcomes in many studies, rather than being specific to suicidality. Mental health conditions are important factors to consider when it comes to suicide, and in the present study they show potential mediating effects. In this study, meeting the criteria for depression or anxiety was tested as a mediator between childhood maltreatment and suicide. Following the Baron and Kenny[57] approach, evidence of mediation is established by examining a significant association between the predictor and outcome, then between the predictor and mediator, and lastly by assessing the change in the predictor-outcome association when the mediator is included. In Table 3.4 above, the total effect indicates a significant association between childhood maltreatment and suicidality for both groups. Then, childhood maltreatment also significantly predicts mental health conditions when analyzing the mediator path. Lastly, in the model including the mediator, the odds ratio for both categories of childhood maltreatment decreases but remains significant. This decrease in magnitude indicates that mental health conditions may partially explain the association between childhood maltreatment and suicidality. Potential mediation, and the fact that childhood maltreatment remains associated with suicidality, insinuates there may be other contributors explaining this association. This association could be mediated through other mental health conditions that were not assessed, or other factors such as stress. Research has shown that children with experiences of neglect or abuse may be subject to increased allostatic load.[125] Chronic stress can lead to changes in brain chemistry or brain metabolism as a biological response.[111,122-124] The result of exposure to chronic stress has shown

to place individuals at an increased risk for negative mental and physical health outcomes.[124] Therefore, this may be among other factors that explain the association between childhood maltreatment and suicidality.

The association between childhood maltreatment and suicidality has a plausible explanation. Given the theories of suicide such as the IPTS[62,63] and the 3ST[67,68] that hypothesize an ideation to action framework, childhood maltreatment may contribute to the development of ideation and an attempt. Children who endure maltreatment of any type may acquire feelings of being a burden, or believe they are worthless. Abuse may also inhibit the ability for children to form social bonds or attachments if they are not exposed to them at a young age. This could lead to a sense of thwarted belongingness later on. Enduring childhood maltreatment exposes children to pain, and trauma, and from a young age they could learn to desensitize to these feelings, therefore having a lesser fear of death, and increasing the capability to engage in suicidal behaviours.[62,63] This same process is also relevant using the 3ST. Childhood maltreatment may contribute to the experience of pain and hopelessness which can create thoughts of suicide. Similarly, as mentioned above, children exposed to maltreatment may not establish meaningful connections at a young age or into their developing years, inhibiting the protective effects of connectedness. Then, habituation to pain, or desensitizing to those negative feelings can lower fear for death, and increase capability for suicide.[67,68] Both theories may aid in explaining the associations found within this study. There was a significant association found between childhood maltreatment and suicidality at each level of maltreatment (low exposure, and high exposure). Given that suicidality includes ideation, planning, and attempts, it makes logical sense that those who reported any type of maltreatment may have experienced those feelings of

worthlessness, pain, or hopelessness. Based on the IPTS and 3ST this is enough to create ideation, and enough to progress to a plan and/or attempt later on.

Strengths and Limitations

This study had some limitations that should be acknowledged. The MHACS had a relatively low response rate introducing the possibility of a low sample count for the subsample of 18 to 29 year olds analyzed, and an overall concern of non-response. Due to the use of survey weights to the sample and analysis this bias was mitigated. However, the use of weights may increase the variance of the estimates as a trade-off. Measures were taken to address this such as the use of bootstrap replicate weights for estimating the variance more accurately. The bootstrap weights help account for the complexity of the survey design and weighting leading to more reliable standard errors and confidence intervals. The creation of the variables used in the analysis may also introduce some limitations in the results. For example, the suicidality variable was created by combining the presence of ideation, a plan, or an attempt into a binary outcome. Although this simplifies the interpretation of the outcome, collapsing these categories takes away from the type of suicidal experience someone has which may differ in severity. A suicide attempt may pose a different risk than suicidal ideation. Therefore, this study does not give a specific result in terms of what aspect of suicide is the most concerning. Additionally, grouping depression and anxiety criteria into one variable was used to ensure adequate counts in this category, however, it creates the assumption that these two conditions are equivalent in how they relate to suicidality. It makes it unclear exactly what is driving the effect or association. This study also did not analyze specific gender analyses when it came to experiences of childhood maltreatment. Given past research has shown the type of maltreatment experienced by males and females may differ, this could provide even more insight into the analyzed variables.[16,21-23]

Future research should address these limitations in a Canadian context to provide a better understanding of the topic.

Given the cross-sectional design of the survey and this study, there are some relevant limitations by this design. Causality between these variables cannot be established, however, there are some strengths that contribute to more confidence in the direction of this association within the study. For example, temporal sequence could be implied due to the nature of the variables analyzed. While it cannot be made certain that childhood maltreatment occurs prior to suicidality, it might be reasonable to assume that enduring trauma at a young age would pose a risk to future adult wellbeing. Systematic reviews have shown that the experience of childhood maltreatment significantly increases the occurrence of suicidality in adulthood.[53] Dose-response is also not something typically observed in a cross-sectional study. However, given the plausible temporal sequence and the different categories of childhood maltreatment, this was able to be analyzed with increasing severity levels. This study has many strengths including the existence of an implied temporal sequence, repetition in past studies, plausibility of association, and dose response observation.

Future research should consider the limitations mentioned to improve the reliability of results. However, due to a lack of more recent studies in Canada on this specific topic, this study lays a strong foundation. Research should include an even younger sample of youth to assess these associations and include more gender specific analyses for more nuanced results.

Conclusion

Childhood maltreatment is a major public health concern and has shown to contribute to suicidality in this study and in previous research. Youth are at an increased risk for suicide outcomes[77-79] yet there is a lack of recent studies in Canada that examine youth samples when

analyzing childhood maltreatment as a predictor to suicide. Additionally, there are not many recent studies in Canada that have examined a dose response association. This study revealed that youth and young people in Canada who experienced childhood maltreatment were significantly more likely to experience suicidality outcomes than those with no experience. This analysis showed evidence of a dose response relationship where, as the number of childhood maltreatment types experienced increased, the higher the odds were of having the outcome suicidality. The association also showed evidence of mediation by the mental health conditions of depression or anxiety. These results contribute to a wide range of existing literature but add new insight on the topic in a Canadian context. The findings could support the development of targeted interventions or policies aimed at reducing suicidality in vulnerable youth, particularly those exposed to childhood maltreatment.

CHAPTER 4: MINORITY STATUS AS A PREDICTOR OF YOUTH SUICIDALITY IN CANADA

Abstract

Background: Youth mental health is an ongoing global concern, with suicide as a leading cause of death across many countries. Visible minorities, sexual identity minorities, and Indigenous peoples are at increased risk for suicidal behaviours. Mental health conditions and childhood maltreatment are two variables that disproportionately affect these groups as well. Therefore, they may show mediating effects for this association. In this study, the association between minority status and suicidality in Canadian youth aged 15 to 24 was explored.

Methods: A secondary analysis took place utilizing data from the Statistics Canada 2022 *Mental Health and Access to Care Survey* (MHACS) to examine the research questions. Demographic characteristics, logistic regression models, and mediation models were built using weighted bootstrapped data to analyze national level estimates.

Results: Minority status was associated with increased odds of suicidality. The mediation analysis revealed that childhood maltreatment may partially explain this association, while mental health conditions did not meet all mediation criteria. Individuals within the Men+ gender category were less likely to have the outcome suicidality compared to the Women+ group.

Discussion: This study lays a sufficient foundation for research in Canada exploring minority youth suicide which has been relatively underexplored. The results support previous research that suggests minorities are at an increased risk of suicidality. This study contributes new insight into the context of Canadian minority youth and highlights the importance of considering minority status in future research and policy development.

Conclusion: These findings indicate that minority youth are more likely to have the outcome suicidality compared to their non-minority peers in Canada, and this association may be partially

mediated by childhood maltreatment. Evidence based interventions should be developed to address this disparity, ensuring adequate access to mental health supports that are tailored to minority youth. Addressing this gap could aid in prevention of premature death due to suicide in Canada's youth population.

Introduction

Background

Suicide is the intention to take one's own life, and it accounts for an estimate of over 700,000 deaths each year across the globe.[2,59] Suicide is an ongoing global public health concern that remains a leading cause of death among youth, and deaths by suicide have increased in some countries over recent decades.[2] A risk of suicide due to having thoughts of death, having a plan for it, or executing an attempt is understood as suicidality.[37] While suicide risk is a concern for all age groups, youth are considered a particularly vulnerable group. As of 2021, the WHO reported for youth age groups spanning 15 to 29, suicide was among the leading causes of death across the globe.[1] Suicide death for this age group has accounted for about 8.5% of all deaths around the world.[1] Youth are at an elevated risk of suicide as ideation tends to increase around years of adolescence from 12 to 17. For those who experience suicidal ideation during adolescence, the risk of an attempt becomes up to 12 times higher by age 30 compared to those without ideation.[77-79,81] Additionally, as adolescents age death by suicide becomes increasingly common around the ages of 15 to 19 years.[77-79]

In Canada, suicide was the second leading cause of death in 2023 for those aged 15-24, and 25 to 29.[3] Longitudinal national data indicated a rise in the prevalence of suicidal ideation, plans, and attempts among samples of youth across Canada.[4,32,82] Aspects of suicidality have also shown to differ by sex where males are more likely to complete a suicide attempt, but females are more likely to show suicidal behaviour.[4,60] There are many risk factors in addition to being young that may contribute to suicidality such as, having a history of suicidal behaviours, being exposed to violence, having a mental health condition, or being a member of a minority group.[60]

However, some of these concerns are underexplored, or lack recent data in Canada, indicating a need to better understand the situation in a Canadian context.

Minority Disparities

Minority groups are often at a higher risk for poor mental health and suicide.[15,33,34,139,140] Visible minorities are defined by the Employment Equity Act of Canada as those other than Aboriginal peoples who are not Caucasian or White.[97] This definition excludes Indigenous peoples; however, for this paper Indigenous individuals and visible minorities are collectively referred to as racialized minorities. Using the term racialized minorities acknowledges the impact of systemic racism and marginalization on suicidality among minority youth populations in Canada. Sexual identity minorities are also considered a minority group throughout this paper and include those who identify as LGBTQ+ or with a non-heterosexual orientation. Minority youth often show disproportionate rates of suicide due to their minority status.

A large amount of research concerning racialized minorities and suicide has been conducted outside of Canada. In the United States longitudinal data has shown increases in suicide attempts, injury by attempt, and suicide deaths for Black youth aged 10 to 19.[7] By 2017, suicide was ranked as the second leading cause of death for these groups.[7] Additionally, other results indicated over a ten-year span from 2010 to 2020 when comparing groups of racialized youth, Black youth had the fastest increase in suicide rates than any other group from 6.9 per 100,000 to 12.9 per 100,000.[86] When considering the history of suicide among Black populations, Black youth have not previously been considered at a high risk for suicide.[7] This discrepancy may be due to certain discriminatory, or stereotypical views of these groups, leading to suicide being underreported or misclassified, therefore misrepresenting the prevalence of suicide among Black individuals.[9,10]

Other research has reported on suicide outcomes among a broader range of minority groups as well. In the United States it was found between 2018 and 2019 that suicide rates increased for racialized youth but decreased for White individuals.[49] In 2020, it was found that American Indian and Alaska Native youth who represented less than 1% of the population aged 10 to 19, had the highest suicide rate compared to any other racialized group at 41.9 per 100,000.[86,99] Similar trends for Indigenous populations in Canada have been reported as well. Indigenous groups in Canada consist of individuals belonging to First Nations, Inuit, and Métis populations. Over a five-year span from 2011 to 2016 across all Indigenous groups, suicide rates were significantly higher than non-Indigenous Canadians. Across all groups there was a higher risk for males and for all youth aged 15 to 24.[14] There is a lack of evidence concerning other racialized groups in Canada indicating a need to address this gap.

Sexual identity minorities have consistently shown higher rates of suicidality compared to their heterosexual counterparts, experiencing on average two to five times the rate of attempts.[8,103] Longitudinal research from the United States following individuals from age 15 to 22 reported sexual identity minorities exhibited a significantly higher prevalence of suicidal ideation, planning, and attempts compared to heterosexual individuals.[104] An interesting finding from this study was that the onset of suicidal behaviour started at a younger age for the sexual identity minority group.[104] Research in Canada supports these findings utilizing data from the 2015, 2016, and 2019 CCHS reporting a higher prevalence of suicidal ideation, and suicide attempts among sexual identity minorities compared to heterosexual individuals.[105] Other research in Canada focused more specifically on youth has found similar trends, where sexual identity minorities are often at an increased risk compared to their heterosexual peers.[12,13,107,108]

Suicidality disproportionately affects minority youth, with more recent research needed regarding the impact on these populations in Canada.

Minority Youth Mental Health

Minorities may face additional stressors due to their minority status that contribute to increased rates of suicide and suicidality. For example, encounters of racism or homophobia may act as a precursor for mental health conditions including suicide.[6] Some studies have shown that perceived racism was significantly correlated with suicidal ideation, and with symptoms of depression among Black participants.[101] Rates of suicide are concerning for racial minority youth; however, these groups have shown to be significantly less likely to have a diagnosis or receive treatment for a mental health condition.[10,85,138] This is an interesting finding given that it is often assumed the pathway to suicide involves mental health conditions or symptoms. A study has shown on the pathway from perceived discrimination to suicide ideation, depressive symptoms fully mediated the association.[101] These contradictory findings may suggest a more systemic concern with potential gaps in access to care, discrimination, or stigmatization for these groups.[137] Research has identified that validated tools used for depression and anxiety have rarely been tested with large samples of racial minorities, suggesting a lack of cultural consideration when developing these instruments.[141,142] This could lead to underdiagnoses or misdiagnoses in these populations, with some research indicating this to be the case in a population of Black youth where symptoms of depression were categorized as a behavioural concern.[143-145] Sexual minority youth experience more societal discrimination compared to heterosexual individuals. Research has consistently shown that they are more likely to have a diagnosis of a mental health condition compared to their heterosexual peers.[33] A systematic review has reported that sexual identity minority youth have increased levels of depression,

anxiety, or bipolar disorder, and suicide attempts.[34] There are concerning rates of suicide among minority youth populations, and there is research surrounding mental health conditions as a mechanism to explain the pathway from minority status to suicide. Given these ideas and evidence, mental health symptoms could mediate this association in a Canadian sample of youth.

Minority Childhood Maltreatment

Childhood maltreatment may involve being exposed to domestic violence, being neglected, or experiencing emotional, physical, or sexual abuse.[16,40] Childhood maltreatment has been deemed a major public health concern with studies in Canada reporting 32% of the population had experienced a form of childhood maltreatment.[16] Studies have reported that childhood maltreatment is significantly associated with suicidal outcomes.[16,24] However, childhood maltreatment has shown to disproportionately affect minority groups.[25,28-30] Much literature surrounding childhood maltreatment often focuses on Adverse Childhood Experience (ACE) scores which typically include a score based on experiences of maltreatment, neglect, abuse, and household dysfunction.[127] Research examining racial minorities has shown that these groups often have higher ACE scores than their White peers.[26,130,131] In the United States, a study reported that Black youth were heavily overrepresented in child maltreatment reports, and Native Americans showed the highest rate of ACEs.[31] Similar findings have been reported in Canada where longitudinal data from Black children in Quebec faced notable disparities in interventions from child protective services compared to White youth.[135] Another study in Canada reported that First Nations children made up 2.5% of the child population but they represented 7.4% of maltreatment investigations, with much higher rates of ongoing services, and out of home placements compared to White children.[134]

These patterns are consistent across sexual identity minorities as well. Research consistently shows that LGBTQ+ youth experience higher rates of ACEs compared to their heterosexual peers.[25,27-29] In a United States study utilizing a nationally representative sample of adults, bisexual participants reported the highest rates of childhood sexual abuse and suicide attempts compared to all sexual identity groups.[129] Canadian research using a youth sample supports these findings with one study showing that non-heterosexual youth had significantly higher odds of experiencing all five forms of maltreatment including exposure to intimate partner violence, neglect, and physical, sexual, and emotional abuse.[128]

Due to the idea that minority status youth are disproportionately at risk for suicidality compared to non-minority youth, exposure to childhood maltreatment may mediate this association and it is an important factor to consider as an explanation for this connection.

Systemic Inequities

It is important to understand the larger systemic issues at play to help address the inequities minorities face. For example, it is evident how racism has been embedded into our societies. Due to the historical influence of systems that perpetuated discriminatory practices, society today continues to reinforce these inequities.[111] These systems may be a part of why minority groups are at a higher risk for adverse health outcomes like suicide.[111] Data from the United States has indicated that there are often neighbourhoods that unintentionally segregate racial groups, with some areas being predominately White and others being mainly composed of racial minorities.[112,113] This has shown to create issues surrounding access, utilization, and quality of healthcare services. Within neighbourhoods composed of mainly racialized minorities there tends to be a lack of investment in health promotion, there are poor quality facilities, and less healthcare providers with the appropriate competence.[112,113] This has also posed an issue for

sexual identity minorities with some studies reporting that access to care was difficult because of the rarity of finding a healthcare provider that was culturally competent to address their concerns.[118,119]

There is similar evidence in Canada highlighting the systemic inequities. For example, a qualitative study utilizing First Nation individuals in Manitoba revealed that systemic racism in healthcare can lead to poor health outcomes, limited access to care, and a strong mistrust of institutions as a consequence of colonization and ongoing trauma.[121] The participants commonly described barriers due to location from the nearest healthcare facility, language and cultural barriers, being subjected to harmful stereotypes, and just feeling undervalued.[121] They often felt they experienced biased or inadequate treatment which deterred them from continuing to seek care. Although most of the research concerns racialized minorities, there is reason to speculate the mistreatment of sexual identity minorities given the similar pattern they have with regards to mental health and suicidal outcomes. These findings surrounding the issue of institutional discrimination highlight the need to address these concerns to protect vulnerable populations who are already at high risk for adverse health outcomes.

Theoretical Basis

To understand the minority disparity regarding mental health outcomes, a theory of minority stress was proposed by Ilan Meyer in 2003.[11] The original goal of the theory was to explain the factors related to mental health inequities among sexual identity minority populations, however, it has expanded to include other minority groups as well.[109] The theory posits that members of minority groups experience greater negative health outcomes due to excess stressors they experience because of their social identity.[11,109,110] These stressors contribute to the large health disparities that have been discussed. Social identity may refer to an

individual's race, sexuality, or gender.[11] Due to this identity, there may be excess stress encountered in everyday life (referred to as minority stress) on top of the general day-to-day stress.[109] These excess stressors may include systemic issues such as dealing with discriminatory laws or policies, or they may be more individual such as being a victim of violence, being treated unfairly by others, or being disrespected based on identity.[109] Participants in qualitative research have emphasized these ideas by identifying social stressors such as bullying, or minority stress based on their sexual or gender orientation contributed to their suicidality.[108] Other participants within this same study noted emotional issues such as loneliness, feelings of worthlessness, and hopelessness were common reasons for making a suicide attempt.[108] This information aligns with common ideation to action frameworks of suicide such as the Interpersonal Theory of Suicide and the Three Step Theory that state these feelings are enough to drive suicidal ideation/intent, and with access to the means, it makes it possible for individuals to make an attempt.[62,63,67,68]

Stress plays an important role in the health status of individuals. Research has demonstrated how excess stress can contribute to poor health outcomes as it is proposed by the minority stress theory. For example, perceptions of discrimination can lead to a stress response in the body that can influence mental and physical health.[111,122-124] For minority status individuals who may encounter these types of discriminatory stressors daily, it becomes a chronic stressor that has the capacity to influence changes in brain chemistry or metabolism as a biological response.[111,122-124] Experiences of discrimination can increase allostatic load and inflammation which contributes to chronic illness or mental health issues.[110] For example, a study including African Americans found perceived discrimination was linked to trauma-like symptoms, and long-term health risks such as suicide.[6,110] The biological stress response aids in understanding

the application of the minority stress theory and gives a better idea as to why minorities are disproportionately at risk for worse health outcomes compared to non-minority individuals.

The Present Study

There is a lack of research within Canada exploring the topic of minority youth suicide and the contributing factors. Evidence suggests factors such as mental health conditions and exposure to childhood maltreatment may be important mediators of the association between minority status and suicidality which therefore will be explored in this study. The following research questions will be addressed:

1. How does the likelihood of suicidality differ between minority status and non-minority status youth aged 15 to 24 in Canada?
    a. Does the experience of childhood maltreatment mediate the association between minority status and suicidality?
    b. Does meeting the criteria for depression or anxiety mediate the association between minority status and suicidality?

Methods

Study Design

Data was analyzed from the Mental Health and Access to Care Survey (MHACS), which was distributed by Statistics Canada in 2022.[36] The aim of the original survey was to assess the mental health status of Canadians, the impact of the COVID-19 pandemic on population health, the access and utilization of mental health services, and the links between mental health and other factors.[36] Using a cross-sectional design, the MHACS was a repeat of the 2012 Canadian Community Health Survey on Mental Health.[36] To obtain the study sample, the frame for the survey was the respondents from the 2021 long form Census. Statistics Canada used a simple

random sampling method and facilitated the oversampling of those who identified as visible minorities to ensure sufficient data from these groups were found.[36]

The sample consisted of Canadians living in the 10 provinces over the age of 15 as of March 1, 2022. If individuals lived on reserves or Aboriginal settlements, were full-time members of the Canadian Forces, or living in a collective dwelling, they were excluded from the survey.[36] Internet-Based Electronic Questionnaires, a type of computer-assisted telephone interview, were used to collect data for the MHACS.[36] This method involved conducting an interview over the phone with a trained interviewer using a computerized questionnaire.[36] The response rate was deemed to be about 25%, with a total of 9861 interviews done. The data collection took place from March 17 to July 31, 2022.[36]

Survey Weights. Statistics Canada applied survey weights to the MHACS to ensure the data was representative of the broader population. A weight variable was created and adjusted to account for the complexity of the sample design, non-response, probability of selection, and known population totals.[36] There were also 1,000 sets of bootstrap weights created for estimating variability. Due to the generalized bootstrap methodology used, the survey indicated that the bootstrap weights underestimated the variance. To correct this in the present study, a scale factor and replicate scale factor of 1/9 was applied in a survey design object during the analysis phase (described below) of the study to ensure accurate estimates.[36]

Measures

Outcome variable: Suicidality. Suicidality is understood as a risk of suicide due to suicidal ideation, intent, a deliberate plan, or making a suicide attempt.[37] To identify the risk of suicide, an evaluation by a physician is the common gold standard measure. However, there were no scales or measures indicated in the MHACS to evaluate suicide risk. However, there were a

range of questions to examine suicide risk such as “Did you ever seriously think about taking your own life”, “Did you ever make a plan for attempting suicide?”, or “Have you ever attempted suicide or tried to take your own life?” eliciting either a ‘Yes’ or ‘No’ response.[36] For the purposes of this study suicidality was assessed by the responses given for the previously mentioned questions. Suicidality was created as a dichotomous variable by categorizing the respondents that answered “Yes” to any of the questions as 1 = suicidality, and those who answered “No” to all of those questions as 0 = none.

Exposure variable: Minority Status. For the purposes of this study racialized minorities and sexual identity minorities are combined and categorized as “minority status” to ensure sufficient representation of this group. The exposure variable was also created as dichotomous. For participants who identified as a visible minority[97], with an Indigenous identity, or with any sexual orientation other than heterosexual, were coded as 1 = minority status. If they did not identify with any of these conditions they were coded as 0 = non-minority.

Mediating Variable: Mental health symptoms. For the purposes of this study mental health conditions of depression and anxiety were analyzed. The gold standard diagnosis for a depression or anxiety disorder typically requires a diagnosis by a physician, however, this was not feasible for a large scale survey such as the MHACS.[42] Instead, respondents were asked questions to determine if they meet the criteria for depression or anxiety based on the World Health Organization Composite International Diagnostic Interview-Short Form (CIDI-SF) screening tool which evaluates mental health disorders as per the diagnostic statistical manual (DSM).[41] Based on the lifetime algorithm for depression and anxiety, if respondents met either of these criteria they were coded as 1 = mental health condition, and if they did not meet either of the criteria’s they were coded as 0 = no mental health condition.

Mediating Variable: Childhood maltreatment. Childhood maltreatment is measured in the MHACS through questions regarding any encounter of abuse or neglect prior to the age of 16.[36] Participants answered questions related to experiences of witnessing domestic violence, or encountering physical, or sexual abuse.[36] For the different types of childhood maltreatment, every respondent was asked how many times they experienced the type of maltreatment ranging from never to up to 10 times or more.[36] The MHACS takes the responses from those questions and categorizes them into how many different types of maltreatment they experienced. To assess mediation effects of childhood maltreatment in this study, a categorical variable was created which coded respondents who reported no experiences of childhood maltreatment as 0 and those who experienced any type of maltreatment (from one to six types) as 1. A third category of "Not Asked" (coded as 2) was added for this analysis to minimize the number of missing values as only participants over the age of 18 were prompted with questions about childhood maltreatment.

Covariates. The confounders of age and gender were considered for this study. As age only included those aged 15-24, it was not necessary to include in the regression or mediation models as it did not significantly change the coefficient. Gender was tested as a confounder as past literature has shown sexual orientation may be associated with minority status, as the rates for those who identify as LGBTQ+ may differ for men and women.[8] Gender has also shown associations with suicidality as the rates differ by gender.[15,46-48]

Statistical Analysis

R studio software was utilized to conduct all of the analyses described in this paper.[55] The weighted bootstrapped data was used to compute descriptive statistics as well as all models. A separate data frame was created from the MHACS with the variables categorized as described above. The variables included in the analyzed dataset included minority status, suicidality,

childhood maltreatment, mental health conditions, age, gender, the weight variable, and all bootstrap replicate weights. The frequencies reported for the descriptive statistics were obtained using the survey package in R[56] to understand the distribution of the data within the subsample analyzed. This same package was used to build the bootstrapped logistic regression models, the mediation models, and to calculate the odds ratios and 95% confidence intervals with an alpha value of $\alpha = 0.05$. Gender and age were added to the regression models to test for confounding effects. Only gender met the criteria and was maintained in the adjusted model. Mediation was tested according to the Baron and Kenny[57] approach. This method involves testing the total effect of the exposure on the outcome, examining the mediator path and the effect of the exposure variable on the mediator, the effect of the mediator on the outcome through the exposure, and lastly the direct effect of the exposure on the outcome through the mediator.[57]

Ethics Approval

For the present study, ethics approval was granted by the Research Ethics Board through the University of Alberta (Study ID: Pro00142299).

Results

Sample Characteristics

The estimates produced in the analysis are all weighted to reflect the findings at a national level. The weighted population estimate (N = 3,746,988) characteristics are presented in Table 4.1. The demographic characteristics show 49% of the sample were minority status, 48% were women+, and 25% were between the ages of 15 to 17 with the remaining between the ages 18 to 24. The clinical characteristics revealed that 12% of the participants met the criteria for suicidality, 28% had experienced some form of childhood maltreatment, and 22% met the criteria for a mental health condition of depression or anxiety.

Table 4-1. Population estimates

Characteristic	*N* (%)
Minority status	
Yes	1 840 984 (49)
No	1 906 004 (51)
Suicidality	
Yes	462 499.2 (12)
No	3 284 489.6 (88)
Gender	
Men+	1 949 473 (52)
Women+	1 797 516 (48)
Childhood maltreatment	
Yes	1 048 085.0 (28)
No	1 767 468.4 (47)
Not asked (age 15-17)	931 435.4 (25)
Mental health criteria	
Yes	839 771.6 (22)
No	2 907 217.2 (78)
Age	
15-17	931 435.3 (25)
18-24	2 815 554 (75)

Weighted frequencies.

Suicidality by Minority Status

In Table 4.2 the weighted descriptive prevalence of suicidality by minority status is displayed. The respondents who identified as being minority status showed a higher prevalence (~15%) of having a suicidality outcome compared to the non-minority respondents with a prevalence of ~9%. Weighted bootstrapped logistic regression models were built to compare the odds of suicidality between minority respondents and non-minority respondents (Table 4.3). The unadjusted model showed that minority status respondents were 74% more likely to have a

suicidality outcome compared to non-minorities (OR = 1.74; 95% CI: [1.14, 2.66]). When the model was adjusted for gender, the odds of suicidality still remained significantly increased for minority status respondents (OR = 1.65; 95% CI: [1.08, 2.52]). Compared to the women+ gender, men+ were 47% less likely to have a suicidality outcome (OR = 0.53; 95% CI: [0.34, 0.81]).

Table 4-2. Weighted prevalence of suicidality by minority status

	Suicidality (%)	Non-suicidality (%)
Minority	282 634.2 (15)	1 558 350.1 (85)
Non-minority	179 865.0 (9)	1 726 139.4 (91)

Weighted frequencies.

Table 4-3. Weighted bootstrapped logistic regression analysis for unadjusted and adjusted models

Variables	Unadj. OR (95% CI)	Adj. OR (95% CI)
Minority status		
No	Reference (1.0)	Reference (1.0)
Yes	1.74 (1.14, 2.66)	1.65 (1.08, 2.52)
Gender		
Female+	Reference (1.0)	Reference (1.0)
Male+		0.53 (0.34, 0.81)

Adj. OR adjusted for gender.

Mediation

The weighted bootstrapped mediation results are displayed in Table 4.4. Both childhood maltreatment and mental health conditions were tested as potential mediators using the Baron and Kenny approach with logistic regression models.[57] The total effect of minority status on suicidality, as reflected in Table 4.3 with the adjusted OR, showed increased odds of suicidality compared to non-minority status respondents (OR = 1.65; 95% CI: [1.08, 2.52]). Gender was left

in the model as it was established as a confounder previously. The effect of the exposure on the mediators were tested in separate models, and the results are displayed as the mediator paths in the table. Minority status was significantly associated with childhood maltreatment (OR = 1.72; 95% CI: [1.32, 2.24]) but not significantly associated with mental health (OR = 1.25; 95% CI: [0.89, 1.77]). When examining the direct effects by including the mediators in separate models with the exposure and outcome, the odds ratio decreased and became non-significant for childhood maltreatment (OR = 1.36; 95% CI: [0.88, 2.09]) and decreased while remaining significant for mental health (OR = 1.57; 95% CI: [1.02, 2.43]). As mental health did not meet all criteria under the Baron and Kenny[57] framework there is no evidence of mediation for this variable. Childhood maltreatment shows evidence of partial mediation under this approach.

Table 4-4. Weighted bootstrapped mediation analysis

Effect	OR (95% CI)
Total effect[a]	1.65 (1.08, 2.52)
Mediator path[b]	
Childhood maltreatment	1.72 (1.32, 2.24)
Mental health conditions	1.25 (0.89, 1.77)
Direct effect[c]	
Childhood maltreatment	1.36 (0.88, 2.09)
Mental health conditions	1.57 (1.02, 2.43)

[a] **Total effect**: Estimated from the adjusted model of minority status on suicidality without either mediator
[b] **Mediator path**: Estimated from the model of minority status on each mediator mental health and childhood maltreatment
[c] **Direct effect**: Estimated from the model of minority status with each mediator on suicidality

Discussion

The association between minority youth and suicidality was examined in this study. The prevalence of suicidality showed to be higher among minority youth compared to non-minorities

based on the MHACS data from 2022. Minority status was based on if the respondent identified as a visible minority, with an Indigenous identity, or with a non-heterosexual orientation. It was established that identifying as a minority was associated with increased odds of suicidality among youth aged 15 to 24. The potential mediator's childhood maltreatment and mental health conditions (of either depression or anxiety) were tested for mediating effects. The results indicated that childhood maltreatment may partially explain the association from minority status to suicide, while mental health did not meet all mediation criteria. The prevalence of suicidality was higher among minorities than non-minorities, and the adjusted logistic regression model showed that minority status youth were 65% more likely to have a suicidality outcome compared to their non-minority status peers. Those individuals in the men+ gender category were shown to be less likely to have a suicidality outcome than women+. Existing literature often suggests that males are more likely to engage in attempts or die by suicide than females.[3,46-48,60,87,88] However, females are often more likely to have poor mental health outcomes, and experience more suicidal ideation.[32,82,87,88] It has been suggested that females may have a lesser intent to die than males, they often use less lethal means, and therefore they have a higher chance of being rescued from an attempt.[92-94,96] In the present study where the men+ group showed to have less odds of the outcome suicidality, it may be likely that the combined outcome of suicidality was influenced most by ideation, which is often more prevalent in females due to the potential underreporting by men based on societal expectations and norms.[89,90] Future research can explore this assumption by analyzing gender-specific results and examining aspects of suicidality separately. Overall, these findings suggest a moderate association and warrant some attention in the Canadian public health context.

Racial and sexual identity minorities are at an elevated risk of suicide. Black youth in particular in the United States have shown substantial increases in suicide deaths in the past decade.[7] Suicide death rates for Black youth had increased faster compared to any other racial group as of 2017.[7] Similar trends remained in later research as well, where compared to White individuals suicide rates increased among racial minorities.[49] In both the United States and in Canada, suicidality is a substantial concern for Indigenous populations. Indigenous youth tend to make up a very small percentage of the population, yet they have shown to experience the highest rates of suicide.[14,86,99] An increased suicide risk is relevant among sexual identity minorities as well. The prevalence of suicidality including ideation, plans, and attempts is significantly higher among sexual minorities compared to heterosexual individuals.[104] Past research has indicated that up to 20% of sexual identity minorities attempt suicide in their lifetime, and the rate of attempts is typically two to five times higher than heterosexual individuals.[103] Consistent with past theories of suicide such as the IPTS[62,63] or the 3ST[67,68] that adopt an ideation to action framework, it has been found that from a sample of sexual identity minorities who report suicidal ideation, over 40% of them have a suicide plan, and from there 64% went on to attempt suicide.[104] Canadian data corroborates these findings of increased suicidality among sexual identity minorities in general, and it has been deemed a particular concern for youth as well.[12,13,105-107]

The minority stress theory proposed by Ilan Meyer[11,109] provides a plausible explanation to understand the trends observed in the present study and among the past research discussed. Minority stress occurs in addition to the daily stressors everyone encounters. Minority stress is understood as added pressure on individuals based on their social identity, including race, sexuality, or gender.[11,109] These stressors may be categorized as “distal”, referring to stressors

that develop from people or institutions. This may include discriminatory laws, or policies embedded into the system, or they may include being treated unfairly or disrespectfully by others.[109] Other stressors under the minority stress theory may be "proximal" and include stress from socialization or developing negative personal feelings and having to hide one's identity.[109] Encounters of constant discrimination and stress can lead to poor mental and physical health outcomes.[109-111,122-124] Therefore, the experience of minority stress provides plausible rationale as to why racial and sexual identity minorities have shown increased rates of suicidality outcomes. The present study revealed that childhood maltreatment showed evidence of mediation, while mental health conditions did not meet all criteria. Based on the Baron and Kenny[57] framework for mediation, a significant association must be established for the total effect of the exposure on the outcome. Next, a significant association must be met between the predictor and mediator. Lastly, the change in the predictor-outcome association with the mediator included (the direct effect) is analyzed. If the coefficients decrease, become null, or the association becomes non-significant this suggests evidence of mediating effects. For the childhood maltreatment mediation analysis, it was found that for childhood maltreatment the effect from the total effect to the direct effect was reduced, but the CI became non-significant. This typically supports full mediation under the framework used. However, given that the analytic subsample did not include those aged 15 to 17, as they were not posed these questions, and considering the relatively low power of the Baron and Kenny method in detecting smaller effects, this is interpreted more cautiously as partial mediation. For mental health, the association between minority status and mental health was not significant. Therefore, it did not fulfill all criteria to suggest mediating effects. Given research on the associations between mental health conditions and suicide outcomes, this finding is interesting.[16,32,35,85] Existing literature does suggest that racial minority

individuals are less likely to have a mental health diagnosis compared to non-minorities, yet they often experience more intense depression symptoms and, have a higher risk of suicidal outcomes.[7,14,15,85,101,139,140] Additionally, sexual identity minorities consistently have shown to have increased mental health issues, and consequently, higher suicidality rates.[8,12,13,103-105,107] There may be institutional discriminatory practices influencing treatment, diagnoses, and access to care contributing to this discrepancy where we may have expected to see some influence of mental health conditions.[34,111-121] Therefore, the findings within this paper may be attributed to gaps in access to care, underreporting due to stigma, or the lack of inclusion of minorities when it comes to developing tools for detecting mental health conditions.[7,10,11,15,98] Additionally, the pathway from minority status to mental health conditions may operate through an additional variable such as discrimination or stress, and given the low power of the mediation method used this effect may have been undetected. These implications may have relevance to why there was a lack of mediation evidence detected for mental health conditions. Lastly, the way in which depression and anxiety were grouped together in this study may have also influenced the results observed as there is a lack of specific insight into what drives the association. Conversely, evidence does suggest minorities are more likely to be exposed to childhood maltreatment, which has shown to contribute to suicidal behaviours later on.[16,24-31,128-131,134,135] The finding of childhood maltreatment as a mediator is consistent with this previous research. With these findings in mind, future studies should aim to address the discrepancy around mental health conditions and minority groups.

This study contributes more insight into the Canadian context when it comes to minority youth suicide. While data from other countries suggest it is an issue, there is limited research conducted in Canada that explores minority status as a risk factor for suicidality outcomes in the

same way this study does. The findings indicate that minority youth between the ages of 15 to 24 are at an increased risk of suicidality compared to non-minority individuals. Risk factors for youth suicide should continue to be explored. However, given the increased risk of suicide among minorities, and the potential contribution of childhood maltreatment on these outcomes, this study provides more evidence for informing targeted interventions to prevent these behaviours in youth and young people. This study has some strengths in supporting past research, while adding more evidence from Canadian national data. There are also plausible connections to theory to explain these associations. However, this study is not without limitations. Due to the cross-sectional design of the original survey, and the present study, temporal sequence of these variables typically cannot be determined and therefore causality cannot be established. However, given that racial identity is assigned at birth, and conceptually it is logical to assume that sexual identity would precede suicidality compared to the other way around, there is plausibly an implied temporal sequence between these variables. The original MHACS survey had a low response rate (25%), which may be a concern considering only a subsample of this was analyzed for the present study. This could introduce a low sample size, and an overall concern about non-response. However, the use of survey weights in the analysis addresses these concerns and provides more reliable estimates to be attributed nationally. Given the use of survey weights, there may be a concern that the weights may increase the variance of the estimates as a tradeoff. Therefore, bootstrap weights were utilized to estimate the variance more accurately, and they help account for the complexity of the survey design as a whole. The way variables were created for the analysis introduced some limitations in the results as well. The outcome variable, suicidality, combined any response of ideation, planning, or an attempt into one variable. This aided in ensuring adequate counts for the outcome and provided a more

simplistic analysis. However, collapsing these categories undermines the type of suicidal experience an individual had. For example, if someone has suicidal ideation, this is a different severity level from someone committing an attempt. Therefore, the results of this study do not provide specific details about what kind of suicidal behaviour is the most concerning for this population, but rather it provides more general insight into suicidality as a whole. This may also be a concern for the exposure variable minority status where visible minorities, Indigenous identities, and sexual orientation were combined to ensure adequate counts for the analysis. The results do not provide specific minority group findings but still provide relevant insight within a Canadian context where previous research was lacking. The mediating variable mental health grouped depression and anxiety criteria into one variable as well, which creates the assumption that these two conditions relate to suicidality the same way. Although mediating effects were not observed for this variable, due to this grouping, it is unclear which condition had the strongest influence. Lastly, the mediator variable childhood maltreatment was collapsed into a categorical variable where an individual who experienced one type of maltreatment would be categorized the same as someone who experienced all six types. This poses the same concern in terms of severity levels and providing more specific insights. Additionally, the inclusion of the "Not asked" category for childhood maltreatment was done to maintain the full youth sample in the analysis, however, this may bias the mediation estimates if only the older youth had contributed data. Future research should address these limitations to strengthen and support the findings from this study. For example, future research could employ a longitudinal design on this topic to examine results over time.

Conclusion

Minorities are subject to an increased risk of suicidality as shown in previous literature, and in the present study. This study found that minority status individuals between the ages of 15 to 24 in Canada, were more likely to have a suicidality outcome than non-minorities within the same population. This association was shown to be mediated by the experience of childhood maltreatment, but not mental health conditions. Systemic issues of discrimination, access to care, and stigmatization may contribute to the lack of effect by mental health conditions. Those respondents within the men+ gender category were less likely to have a suicidality outcome, potentially explained by the way the suicidality variable was created for this analysis. There is an overall lack of research on this specific topic of minority youth suicide in Canada, while findings from other areas emphasize the increased risk to suicide minority status and youth have. This study provides valuable insight into some possible contributors of youth suicidality in Canada, highlighting the importance of considering minority status in future research and policy development. The findings could support future research to further explore these associations by addressing the limitations within this study, but overall, the results provide a sufficient foundation for this topic.

CHAPTER 5: GENERAL DISCUSSION AND CONCLUSIONS

Introduction

Youth mental health, including suicidality, has been recognized as a global public health concern, with suicide consistently ranked among the leading causes of death for young people.[1] This thesis examined childhood maltreatment and minority status as potential risk factors for youth suicidality in Canada using a secondary data analysis from the 2022 MHACS.[36] While these risk factors have been explored in other countries or with adult samples, they remain relatively underexplored in the Canadian context. The aim of this thesis was to contribute to this gap by analyzing how experiences of childhood maltreatment and minority status are associated with suicidality among Canadian youth aged 15 to 29. The purpose of this chapter is to synthesize the findings from the previous papers, discuss the broader implications, and outline potential directions for future research.

Summary of Main Findings

In Paper 1 childhood maltreatment was examined as an exposure variable for the outcome suicidality for the youth age group 18 to 29. When examining the prevalence of suicidality among respondents based on exposure to childhood maltreatment, the highest prevalence of the outcome was observed for those who experienced four to six types of maltreatment. When examining the odds of suicidality, the weighted bootstrapped logistic regression models supported this finding by revealing that the odds of suicidality were highest among those who experienced high exposure (four to six types) of maltreatment (OR = 6.85; 95% CI: [3.07, 15.31]). The odds ratio also increased as the amount of exposure increased, indicating a potential dose response relationship for this association as well. The regression models were adjusted for gender and showed that respondents within the men+ category were

40% less likely to report suicidality. However, due to the way the suicidality variable was created by combining ideation, planning, and attempts it is possible the variable was more heavily influenced by ideation which would elicit this result. In the literature females often experience higher rates of ideation compared to males which offers a potential explanation for the finding that those in the men+ group had lesser odds of suicidality.[32,82,87,88] However, men have also shown to be more reluctant in expressing suicidal feelings due to the idea that it could challenge their performance of traditional masculinity that emphasizes strength and resilience.[89,90] Mental health conditions (a combined variable including depression and anxiety) was analyzed as a potential mediating variable following the Baron and Kenny framework.[57] The mediation results revealed that these mental health conditions may partially explain the association between childhood maltreatment and suicidality. Due to only partial mediation, there may be other factors that contribute to this association as well. Considering the research question for this study, the severity of childhood maltreatment (as indicated by the number of types of maltreatment experienced) was positively associated with suicidality among Canadians aged 18 to 29. Mental health conditions of depression and anxiety showed evidence of partially explaining this association.

In Paper 2 minority status, a combination of racial minorities including Indigenous groups and sexual identity minorities, was examined as an exposure variable for the outcome suicidality among the age group 15 to 24. The prevalence of suicidality was higher among minority youths than the non-minority youth respondents. The weighted bootstrapped logistic regression models also revealed that the odds of suicidality were significantly higher for minorities than non-minorities (OR = 1.65; 95% CI: [1.08, 2.52]). These models were also adjusted for gender, and the respondents in the men+ group were less likely to have the outcome

suicidality. As suicidality was categorized the same as it was for Paper 1, it is possible that ideation heavily influenced it here as well. There were two potential mediating variables examined within this paper. Mental health conditions and childhood maltreatment were both categorized as binary or categorical variables, and only childhood maltreatment met all criteria for mediation according to the Baron and Kenny approach.[57] Childhood maltreatment showed evidence consistent with partial mediation for the association from minority status to suicidality. The way in which the mental health variable was categorized, by combining depression and anxiety, could also have influenced the effect it had as a mediator in this study. Additionally, due to the step wise significance test of the Baron and Kenny approach there is low statistical power potentially increasing the risk of a Type II error where mediation was not observed but could be present. Considering the research questions for this study, the likelihood of suicidality was higher among Canadian minority youth compared to non-minority youth. Only childhood maltreatment showed potential partial mediation effects for this association.

Synthesis of Findings

Both Paper 1 and Paper 2 reveal some meaningful similarities. The exposure variable in each paper, being childhood maltreatment and minority status respectively, represent a vulnerable or historically marginalized population. Past literature has suggested that both groups face unique challenges that subject them to negative outcomes. The specific challenges faced by each group do differ, but the underlying thread of marginalization remains consistent. For instance, those exposed to childhood maltreatment experience interpersonal trauma and violence from an early age, where minorities may be subject to systemic discrimination and institutional inequities. These are different types of adversity, however, they contribute both to social disadvantage and chronic stress. Stress has been shown to lead to changes in brain chemistry or

brain metabolism as a biological response in those subject to abuse or discrimination, which in turn can contribute to mental health issues.[111,122-124] Therefore, these experiences highlight how marginalization, either rooted in trauma or discrimination, can contribute to an elevated risk of suicidality across both groups. The results from the papers within this thesis support these statements as they show that these groups are at increased odds of suicidality. These exposure variables, although they were analyzed separately, are also interconnected. Paper 2 examined childhood maltreatment as a potential mediator in the association between minority status and suicidality. It was found to partially explain this association which suggests that part of the suicidality risk observed among minorities might be explained by their disproportionate exposure to childhood maltreatment. Research has shown that minority groups, including racial minorities, Indigenous groups, and sexual identity minorities, are at an elevated risk of enduring childhood maltreatment.[25,27-31,128,132-135] These findings emphasize the need to consider how systemic marginalization may increase vulnerability to outcomes such as suicidality through interacting pathways and highlights the importance of more multidimensional approaches in suicide prevention strategies.

Although there were similarities between the papers, some differences were found as well. Within both papers, mental health conditions was a variable created by combining depression and anxiety and tested as a mediator. In Paper 1, there was evidence of partial mediation by this variable, however, in Paper 2 with minority status as the exposure it did not meet the criteria for mediation according to the Baron and Kenny framework.[57] There are various explanations for this discrepancy. Although these exposures both contribute to the outcome suicidality, there may be different pathways by which this is achieved. For childhood maltreatment, it is often found that these experiences contribute to the development of mental

health conditions which in turn are strongly associated with suicidality.[16,35] However, the association between minority status and mental health conditions may be more indirectly influenced by factors such as discrimination (even though this was not directly analyzed), making the pathway from exposure to mediator potentially less direct compared to childhood maltreatment.[6,101] Additionally, due to the stigmatization of mental health concerns among minority populations, along with systemic discrimination, there may be some underreporting of mental health symptoms for this group.[137] Another possible explanation could be due to the limitations of the Baron and Kenny[57] mediation approach not capturing all mediation effects, especially in more complex pathways. Overall, there may be more factors to consider on the pathway from minority status to suicidality which could reduce the potential mediating role of mental health conditions under the Baron and Kenny approach.[57]

Strengths and Limitations

There were similarities between both papers regarding strengths and limitations. There were some limitations due to the use of the MHACS. The original survey had a relatively low response rate which introduced the possibility of having a low sample size considering each paper only analyzed a subsample of the survey. With the concern for small sample size comes an overall concern for non-response bias. To mitigate these limitations, survey weights were used, and bootstrap weights were used to estimate the variance more accurately in both analyses. Additional limitations are within how the variables analyzed were created. In both papers, the outcome variable suicidality was created by combining the experience of ideation, a suicide plan, or an attempt into a binary variable where respondents who experienced any of the previous were categorized under “Yes-suicidality”, while the others were categorized as “No-suicidality” if they did not report any of those experiences. Although the combination of the variable in this

way makes interpretation simpler, it obscures the distinction between the levels of suicidality. For example, an attempt is likely to carry more severity than ideation, and therefore it cannot be made clear what aspect of suicidality is the most concerning. This limitation provides an explanation for why it was observed that the men+ group in each analysis was less likely to have the outcome. This was likely due to suicidal ideation having the strongest influence on the suicidality variable, as it is more often seen in females.[32,82,87,88] The same limitation holds for the childhood maltreatment variable in Paper 2 where a respondent who experienced one type of maltreatment was categorized the same as someone who experienced six types of maltreatment, and these likely indicate varying degrees of severity. In both papers the mental health mediating variable combined depression and anxiety, creating the assumption that both conditions are equivalent in how they relate to suicidality. This limits the understanding of what drives the association. Lastly, the way in which minority status was created in Paper 2 by combining the minority groups does not allow group specific results but rather just minorities as a whole. The combination of minority status may limit the intersectional diversity of experiences across the groups included. The combination of all these variables was mainly to address low counts in individual categories; however, these limitations create opportunities to be addressed in future research.

Due to the cross-sectional design of the MHACS, and consequently the present analyses, there are some limitations of this design. With cross-sectional studies, temporality between variables cannot typically be established. While this is usually the case in cross-sectional studies, both papers have variables that can plausibly imply temporal sequence. In Paper 1, while it cannot be made certain that childhood maltreatment precedes suicidality, it is plausible that enduring trauma at a young age would create a risk to adult wellbeing, and there is literature to

support this.[53] Additionally, because of this implied temporal sequence a dose response pattern was able to be observed which is also not typical of a cross-sectional study. In Paper 2, minority status poses a bit of a different situation due to the combination of minorities. Racial minority status (including Indigenous identity) inherently would precede suicidality as it is assigned at birth. Temporality with just racialized minorities can be established. However, the inclusion of sexual identity minorities does not make it as direct. It does seem plausible that sexual identity would emerge prior to suicidality, as it does not make as much sense that suicidality would influence a person's sexual identity. Although temporality cannot be certain, the directionality of minority status to suicidality is plausible here as well. Given these conditions and past repetition of these associations in the literature these present studies have relevant strengths.

An additional strength of both papers is in the way the associations analyzed are supported by theory. In Paper 1 it was found that enduring childhood maltreatment was associated with an increased likelihood of suicidality. This finding is supported by theories of suicide such as the IPTS[62,63] and the 3ST[67,68] which propose an ideation to action framework. Children who experience maltreatment may develop feelings of being a burden, being worthless, and could have impaired social connectedness. Therefore, these conditions are enough to create suicidal ideation which could contribute later to other suicidal behaviours. Additionally, exposure to trauma and pain can lead to desensitization, reducing the fear for death, and increasing the capability for suicide, thus also contributing to suicidality. These are all core elements to the IPTS and 3ST. In this study where it was found that all levels of maltreatment were associated with increased odds of the outcome, the results support the idea that even minimal exposure could trigger ideation, which could escalate over time to planning or attempts. In Paper 2, it was found that respondents that identified as minorities were more likely to have

the outcome suicidality. The minority stress theory offers a framework to understand this association as well. The theory states that exposure to additional stress due to minority status, whether external stressors or internal, there is a psychological burden experienced different from non-minorities.[11,109] Chronic exposure to these stressors has been shown to be associated with negative mental health outcomes, and this offers an explanation for the elevated likelihood of suicidality among the minority respondents in this study.[106-108,119-121]

Implications and Future Directions

Both papers within this thesis draw attention to the need for establishing context specific interventions for negative health outcomes especially for vulnerable groups. It highlights the importance of conducting research with the inclusion of vulnerable groups, in order to understand the current conditions. When it comes to suicidality research in Canada, it was difficult to find minority youth specific research that was up to date and reflecting the current climate of the world. Additionally, it was difficult to find up to date research regarding childhood maltreatment in Canada using samples of youth. These papers add to the current literature in a Canadian context, establish a strong foundation for the use of youth in this kind of research, and encourages future research to address the limitations to build onto what was found here. Additionally, research such as this pushes for the development of more culturally relevant care, and a shift in societal norms to reduce stigmatization of mental health issues for certain groups. There is a need for more national or even provincial level strategies that go beyond crisis interventions and address more proactive measures to protect these groups. Addressing these gaps allow for more evidence-based approaches to prevent suicidality outcomes in vulnerable young people in Canada.

Given the findings of the studies within this thesis, future research should address the limitations to improve reliability of the results and discover new insights. For example, with sufficient counts, future research in Canada could examine specific minority groups, a specific aspect of suicide, or separate mental health conditions rather than grouping them together. Recommendations for policies or interventions based on these results and past research may include developing accessible out of school programs for vulnerable or minority youth. Out of school activities have shown to improve mental health conditions and be a protective factor against suicidality for minority youth.[154-156,161] Additionally, initiatives that foster family and social support (peers, community, teachers, etc.) could be beneficial for preventing poor mental health or negative outcomes such as suicidality in youth.[105,114,150,156,161] Specific for minority youth, past research has shown that instilling a sense of cultural pride, identity, and ethnic socialization has shown to have protective effects for mental health and suicidality.[114,151,152,157-159] Developing youth groups, or programs that can foster these conditions may be a useful way to be proactive against minority youth suicidality. Lastly, it is important to ensure that accessible supports are made known to all youth in Canada, as research has shown access to care has lowered rates of suicidality in youth.[162] Given the nature of this research, it should be emphasized that these accessible supports need to include culturally appropriate care that is delivered by culturally competent healthcare professionals.

Conclusion

Youth mental health and suicidality remain a significant and complex public health concern. This thesis has contributed to a better understanding of the factors that place youth and young people at an increased risk, especially within vulnerable groups. Continued research in these areas is essential to ensure that policies, programs, or interventions reflect the current social

and cultural climate. These findings highlight that there needs to be efforts that go beyond crisis interventions, calling for more proactive measures that involve policymakers, government bodies, and the broader community. Lastly, to address the current conditions of vulnerable youth and minorities within Canada, there is a need for a societal commitment to reducing stigma around mental health and addressing the systemic inequalities disproportionately affecting them. To take a step forward in improving mental health outcomes in youth there must be more inclusive, evidence-based strategies implemented.

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