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Disordered Eating Behaviours in Adolescents with and without a Formal ED Diagnosis: Comparing Individual and Contextual Factors

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A thesis submitted in partial fulfillment of the requirements for the Master of Education degree in Psychology

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Abstract

This study explored various psychosocial factors associated with disordered eating in adolescents accessing mental health services across Ontario, Canada. Data were collected using the interRAI Child and Youth Mental Health (ChYMH) assessment tool and participants were categorized into three groups: individuals with diagnosed eating disorders (ED, $n=207$), disordered eating without a formal ED diagnosis (sub-ED, $n=888$), and other treatment-seeking youth (non-ED, $n=3285$). The ED and sub-ED groups did not differ in many ways, presenting with a similarly greater prevalence of mental health issues, and dysfunctional family and peer relationships, in comparison to non-ED youth. However, the ED group was more likely to have other psychiatric diagnoses (i.e., mood, anxiety, and sleep disorders) than the sub-ED or non-ED groups. These findings highlight a potentially underserved population of treatment-seeking youth in Canada, facing significant psychosocial challenges related to disordered eating, yet lacking access to proper diagnostic services.

Keywords: interRAI; disordered eating; eating disorders; mental health; youth

Summary for Lay Audience

This study investigated various psychosocial factors contributing to the development of disordered eating behaviours in a group of young individuals seeking mental health treatment across Ontario, Canada. The researchers focused on adolescents who exhibited disordered eating patterns (e.g., binge eating/purging, fasting/major restriction of diet, body image concerns) but had not been formally diagnosed with an eating disorder (ED). These participants were compared to two other groups: one with diagnosed EDs and another with mental health disorders but without any eating issues. The results revealed that those with undiagnosed disordered eating behaviours displayed similar psychosocial characteristics to those with diagnosed EDs. Both groups were primarily composed of females and older adolescents. In comparison to the non-ED comparison group, disordered eating participants (ED and sub-ED) had a greater prevalence of participants struggling with high levels of internalizing symptoms, depression, anxiety, and risk of suicide and self-harm, as well as self-reported physical and mental health issues. Both groups also presented with greater family dysfunction and peer bullying compared to the non-ED comparison group. Although both groups presented with similar levels of psychosocial impairment, the main distinction between ED-diagnosed and undiagnosed participants with disordered eating was the number of other formal diagnoses received, with ED individuals diagnosed with more comorbid anxiety, mood, and sleep disorders than the other two groups. Secondary analyses revealed that parents of participants in the ED group presented with especially high levels of caregiver distress and parental distress, in comparison to the non-ED group. The sub-ED group included the most participants with externalizing symptoms, peer conflict, and diagnoses of substance-related and adjustment disorders. These findings highlight the importance of identifying and treating EDs among young Canadians, particularly those who seek mental health treatment but lack access to formal ED diagnoses (sub-ED youth). By identifying the psychosocial characteristics of this underserved population, findings may inform efforts aimed at identifying and addressing disordered eating behaviours in youth across Ontario.

Table of Contents

***Abstract* i**

***Summary for Lay Audience* ii**

***Table of Contents* iii**

***List of Tables* v**

***List of Figures* vi**

***CHAPTER 1* 1**

1. Introduction..... 1

1.2. Etiology and Risks of Disordered Eating 2

1.3. Clinical vs. Sub-Syndromal Eating Disorders (EDs) 3

1.4. Factors Associated with Disordered Eating..... 4

 Age..... 5

 Sex 5

 Marginalization..... 6

 Internalizing and Externalizing Symptoms 7

 Psychiatric Diagnoses 9

 Family Factors..... 10

 Peer Relationships 11

1.5. Social Developmental Model of EDs..... 12

1.6. Current study 13

***CHAPTER 2* 15**

2. Methods 15

2.1. Sample 15

2.2. Measures 17

 InterRAI-ChYMH 17

 Diagnoses 18

 Internalizing Scale 19

 Externalizing Scale 19

 Risk of Suicide and Self-Harm in Kids (RiSsK) 20

 Depression Severity Index (DSI) 20

 Anxiety Scale..... 21

 Family Functioning (CY-FFS)..... 21

 Caregiver Distress 22

 Parenting Strengths 22

 Peer Conflict..... 23

Ontario Marginalization Index (ON-Marg) 23

2.3. Analytic Strategy 24

2.4. Results..... 25

CHAPTER 3 35

3. Discussion..... 35

3.1. Disordered Eating Behaviours36

3.2. Individual Factors37

 Sex 37

 Age..... 38

 Marginalization..... 39

 Internalizing and Externalizing Symptoms 39

 Psychiatric Comorbidity 41

3.2. Family Factors43

3.3. Peer Factors.....44

3.4. Clinical Implications45

3.5. Strengths, Limitations and Research Directions.....47

References..... 50

Appendix..... 65

Significant Key Findings66

List of Tables

Table 1: Age and Sex in the Total Sample, ED, and Sub-ED groups..... 16

Table 2: Demographic variables by group 27

Table 3: Presence of 11 Additional DSM Diagnoses 29

Table 4: Individual factors: Dichotomized Scales and Individual Items.....32

Table 5: Family Factors, Parenting Strengths, and Peer Factors 34

List of Figures

Figure 1: Prevalence of Each Disordered Eating Behaviour by Group 26

Figure 2: Significant Key Findings..... 65

CHAPTER 1

1. Introduction

Disordered eating encompasses a spectrum of abnormal eating patterns, ranging from dieting to clinical eating disorders (Jalali-Farahani et al., 2015). These behaviours include actions like skipping meals, fasting for weight loss, avoiding certain types of food, overeating without hunger, and engaging in purging or excessive exercise (Neumark-Sztainer et al., 2011; Stice & Shaw, 2010). In practice, it can be challenging to identify the threshold between normal eating patterns and disordered eating behaviours (Ackard et al., 2007; Karkkainen et al., 2018). Some scholars have proposed that these behaviours should be considered disordered when they are accompanied by intrusive unhealthy thoughts such as guilt or an excessive fixation on food and weight (Ambwani et al., 2019).

Experts in the field have further acknowledged a lack of definitional clarity when it comes to distinguishing individuals with disordered eating from those who meet the clinical criteria for a formal eating disorder (ED) diagnosis, which is crucial for receiving appropriate treatment (Grange & Lobe, 2007). According to the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-5), disordered eating is considered clinically significant when specific behaviours and cognitive indicators are accompanied by substantial psychosocial distress or impairment (American Psychiatric Association, 2013). However, the exact scope and severity of psychosocial impairment that qualifies as clinically significant remains poorly defined in the current body of literature.

This exploratory study aims to address this gap by identifying unique psychosocial traits of treatment-seeking individuals with undiagnosed disordered eating. The study also seeks to understand how these characteristics differentiate this group from individuals with clinically diagnosed EDs and other populations seeking mental health services without disordered eating patterns. By examining a sample of adolescents accessing mental health services across Ontario,

findings are intended to contribute to our empirical knowledge of adolescent disordered eating, within the Canadian context.

1.2. Etiology and Risks of Disordered Eating

Disordered eating behaviours typically emerge during early adolescence (defined as ages 11-14), a demanding period of growth in academic, social, and emotional domains. These behaviours have been evidenced and increase in severity throughout middle adolescence (ages 15-17) peaking in late adolescence/early adulthood (Karkkainen et al., 2018; Slane 2007). They have received considerable attention from researchers who recognize that these behaviours are associated with significant physical and mental health consequences (Rodgers et al., 2023). If left untreated, disordered eating can lead to nutritional deficiencies, hormonal imbalances, anxiety, and depression (Herle et al., 2020; Rodgers et al., 2020; Wu et al., 2019). Furthermore, longitudinal studies consistently show that disordered eating behaviours are the strongest predictors of developing full-blown eating disorders in young females (Alhaj et al., 2022; Hoek et al., 2003).

Disordered eating can be life-threatening. Among adolescent girls, eating disorders have the highest mortality rate compared to other psychiatric conditions, primarily due to comorbid medical complications and high suicide rates (Hambleton et al., 2022; Iwajomo et al., 2021). Early identification and treatment of eating disorders are crucial and have been associated with improved physical and psychosocial outcomes, reduced mortality rates, and lower costs related to intensive treatments (Koreshe et al., 2023; Russon et al., 2019).

While the prevalence of adolescent disordered eating is increasing, clinical eating disorder diagnoses remain relatively rare (Wilksch et al., 2020). A recent meta-analysis found that approximately 30% of females and 17% of males engage in some form of disordered eating during childhood and adolescence in community samples (Lopez-Gil et al., 2023). However, only a small proportion (approximately 22%) of youth with diagnosable eating disorders or disordered eating behaviours receive treatment from mental health professionals (Geoffrey et al., 2014; Russon et al., 2019). Thus, formal eating disorder diagnoses are relatively uncommon,

with prevalence rates ranging from 2% to 7% in US and Canadian clinical samples (Galmiche et al., 2019; Lopez-Gil, 2023; Statistics Canada, 2016).

One possible explanation for the limited diagnosis and support for EDs is the challenge primary healthcare providers face in effectively recognizing signs of disordered eating before they become severe enough to require clinical intervention (Russon et al., 2019). Youth in mental distress or crisis often turn to public healthcare services to address both their psychological and physical symptoms, which might be linked to undiagnosed disordered eating. It is therefore critical that primary healthcare providers can accurately identify signs and symptoms of disordered eating to ensure that patients at risk of developing clinical eating disorders are identified and treated promptly (Tse et al., 2022). Consequently, researchers should concentrate their efforts on creating efficient screening tools aimed at detecting the constellation of factors indicating the presence of unrecognized disordered eating behaviours among adolescents.

1.3. Clinical vs. Sub-Syndromal Eating Disorders

According to the fifth edition of the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-5), individuals must meet specific behavioural and/or physical criteria to receive a formal ED diagnosis. These diagnoses include anorexia nervosa (AN, marked by a failure to maintain a healthy weight), bulimia nervosa (BN, marked by excessive overeating followed by compensatory behaviours to avoid weight gain), and/or binge-eating disorder (BED, marked by frequent consumption of large amounts of food in one sitting accompanied by feelings of loss of control). A diagnosis within any of these three categories further requires the presence of cognitive indicators such as intense fear of weight gain, distorted body image, or obsessive thoughts about food and body-related attitudes (American Psychiatric Association, 2013).

Two additional diagnostic categories are included in the DSM-5 to account for individuals with disordered eating behaviours that may not meet the full diagnostic criteria. These categories include Unspecified Feeding and Eating Disorder (UFED), and Other Specified Feeding and Eating Disorder (OSFED). A diagnosis of UFED is provided in instances when there is not

enough information to make a more specific ED diagnosis, while OSFED is provided to individuals with disordered eating patterns that do not meet the full criteria for any one diagnostic class. To receive a diagnosis in either of these residual categories, disordered eating behaviours must be determined to cause “clinical distress or impairment in social, occupational, or other important areas of functioning” (American Psychiatric Association, 2013, pp.354). However, as noted above, the specific nature of psychosocial impairment that should be considered clinically significant, as opposed to subclinical, is poorly defined.

Those with disordered eating who do not meet diagnostic criteria have been identified by LeGrange and Loeb (2007) as sub-syndromal EDs. These researchers distinguish this group as a vulnerable population worthy of identification. Others have posited that it is essential to identify, and target known risk factors in this subgroup of adolescents to prevent the development of threshold EDs (Currin & Schmidt, 2005). The current study aims to identify specific psychosocial factors related to clinical ED diagnoses in comparison to sub-syndromal behaviours to determine which factors might be used to help identify the under-serviced and at-risk sub-syndromal group of adolescents.

1.4. Factors Associated with Disordered Eating

A substantial body of literature has focused on identifying characteristics that may be associated with the development of disordered eating within community samples (Rodgers et al., 2020). Demographic, biological, social, and family factors have all been examined as potential risk and protective factors for disordered eating. These factors may be used to predict the development of disordered eating and prevent its progression to clinical levels (Rayner et al., 2013). However, existing research has been inconclusive and used a varying methodology, limiting the reliability of the findings. Further, most studies have relied on small sample sizes due to the relatively low incidence of these behaviours within community samples. The literature associated with individual and contextual factors is reviewed to provide context related to the development of disordered eating behaviours, and to inform diagnostic measures (Frank, 2016).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Age

The onset of sub-syndromal disordered eating behaviours has been found to peak in early adolescence, between the ages of 11 and 14 (Klump, 2013; Cerniglia et al., 2017). This aligns with pubertal development, marked by significant weight gain accompanied by increased awareness of societal pressures emphasizing thinness and amplified concern about peer acceptance, contributing to the development of body dissatisfaction and disordered eating (Patel et al., 2016, Swanson et al., 2016). Although early food and body-related pathologies increase the risk of developing threshold EDs, formal ED diagnoses do not generally occur until middle to late adolescence/early adulthood (Steiner et al., 2003; Tremblay & Lariviere, 2009). When clinical EDs are diagnosed in early adolescence, they tend to manifest differently than in later adolescence. Peebles et al. (2006) demonstrated that younger adolescents were more likely to be diagnosed with unspecified EDs, while older adolescents were more likely to present with specific ED diagnoses of binge-eating disorders and bulimia.

Sex

While clinically diagnosed EDs are significantly more prevalent among females than males, a more nuanced understanding of sex differences emerges when examining sub-syndromal disordered eating behaviours (Hoek et al., 2006; Hudson et al., 2007). Specifically, females are more likely than males to report weight dissatisfaction, dieting for weight control, and purging behaviours. However, when it comes to subclinical binge eating and excessive exercise for weight control, females are either as likely as or less likely than males to report these behaviours (Striegel-Moore et al., 2009). Historically, eating disorders (EDs) were primarily viewed as affecting females; male participants were typically excluded from research studies. However, recent evidence suggests an increase in the prevalence of disordered eating behaviours among males, emphasizing the need for researchers to better understand how symptoms and treatment needs may differ based on sex and gender (Breton et al., 2023, recent meta-analysis)

The differences between the sex and gender constructs are very intricate and the differential role in ED development is not well understood. Briefly, while sex refers to biological characteristics

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

reflected by genetics, physiology and anatomy, gender is a psychosocial phenomenon that includes identity, roles, and relations (Breton et al., 2023; Tannenbaum et al., 2016). Due to limited access to individuals who identify as a sex and/or gender minorities, the current study will examine only differences based on one dichotomous item indicating a cisgender sex dichotomy, categorizing participants as either male or female. For this study, individuals of sex and gender minorities (i.e., those who do not identify with the cisgender binary of male/female) were excluded from analyses. Readers are cautioned against applying findings to populations including all sex and gender identities (see Nagata et al., 2020 for a recent meta-analysis).

Females account for the largest proportion of ED patients throughout adolescence but represent an even greater proportion of the middle to late-adolescent population (Peebles et al., 2006). To examine these demographic variables, the current study will compare the presentations of these behaviours among males and females and between groups of younger adolescents (ages 12-14) and middle adolescents (ages 15-17), groups defined by Peebles et al., 2006.

Marginalization

Historically, eating disorders were thought to be exclusive of white women from high socioeconomic backgrounds, creating a stereotype of the prototypical ED patient as a white affluent woman (Hooper et al., 2021). Accordingly, racial/ethnic minorities and those from socioeconomically disadvantaged backgrounds have largely been recognized as populations who are neglected in ED research, identification, and treatment efforts (Sonneville and Lipson, 2018). Nonetheless, disordered eating behaviours have been evidenced to occur at similar rates among individuals from diverse ethnic, racial, and socioeconomic backgrounds (Hooper et al., 2021). However, formal ED diagnoses remain significantly less common among marginalized populations (Huryk, 2021; Moreno, 2022). Among the many benefits of formal ED diagnoses, they are especially important because they enable healthcare providers to tailor interventions specifically to the diagnosed disorder, improving the chances of successful treatment (Pereira & Alvarenga, 2007). Formal ED diagnoses further facilitate access to insurance coverage for

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

medical and psychological treatments, reducing financial barriers to care (Martin-Wagar et al., 2021)

Existing research has identified barriers to accessing and receiving services in populations with greater ethnic and cultural diversity and/or low socioeconomic status (SES). These barriers include financial difficulties, lack of medical insurance, lack of awareness about available resources, feelings of shame, and fear of discrimination (Rebeck et al., 2001; Sonnevile & Lipson, 2018). Treatment for individuals with eating disorders may further be less accessible to people from lower socioeconomic groups as specialist services are typically concentrated in more affluent areas and many of the services are offered within the private healthcare sector (Hazzard, 2019; Mulders-Jones et al., 2017). Consequently, eating disorder diagnoses remain underreported, underdiagnosed, and undertreated in marginalized populations.

Understanding the complex relationship between disordered eating, socioeconomic status, and minority status requires further research. The present study aims to shed light on inequalities in access to eating disorder support based on area postal codes. By gaining a better understanding of these disparities, we can work towards developing targeted interventions and support systems to address the unique challenges faced by marginalized individuals in relation to disordered eating.

Internalizing and Externalizing Symptoms

Internalizing symptoms (i.e., anxiety and depression) are commonly cited as significant factors contributing to the development of EDs (Stice et al., 2013). In our society with a growing emphasis on an unrealistic thin ideal, adolescents who internalize societal messages and expectations about appearance may be more prone to experiencing frustration and dissatisfaction related to their bodies (Cance et al., 2014).

Previous research asserts that certain behavioural patterns such as anxiety, depression, and impulsivity increase an individual's risk of developing disordered eating. Thomas and colleagues (2021) found that the severity of anxiety and depressive symptoms was positively associated with disordered eating in adolescents. Longitudinal findings have further revealed that

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

internalizing symptoms in early adolescence may increase the risk of developing disordered eating patterns and ED diagnoses in later years (Breton et al., 2022; Sander et al., 2021). This, in turn, may increase an individual's vulnerability to developing symptoms of depression, anxiety and even self-harm (Peterson et al., 2007).

The presence of internalizing symptoms may further amplify the negative emotional states experienced by individuals with EDs, increasing their susceptibility to suicidal thoughts and behaviours (Pisetsky et al., 2017). As such, studies have consistently reported a higher prevalence of suicidal behaviours and intentions among individuals with EDs compared to the general population. A recent systematic review by Amiri and Kham (2023) demonstrated a significantly elevated risk of non-suicidal self-injury, suicidal ideation, suicide attempts, and completed suicides among individuals with EDs, compared to non-ED populations. Scholars have therefore emphasized the urgent need to examine the comorbidity between eating disorders and suicidal risk to gain insights into their etiology (Cucchi et al., 2016).

In contrast to internalizing behaviours, research on externalizing problems (i.e., aggression and hyperactivity) within ED populations has been limited (Levesque, 2011). Existing studies have revealed a positive relationship between unhealthy dieting in early adolescents and an increased likelihood of engaging in externalizing behaviours, such as delinquency, drug use, and risky sexual behaviours in middle to late adolescents, especially in males (Krahn et al., 1996; Neumark-Sztainer et al., 1996; Valente et al., 2023). There is research to suggest that, while internalizing symptoms are associated with anorexia, both internalizing and externalizing difficulties are associated with bulimia (Mitchell et al., 2014). This may be because binge eating involves an element of impulsivity and an expression of emotion, while restrictive behaviours are more covert in nature and may be associated with a repression/restriction of emotion (Barakat et al., 2023). Within ED populations, impulsivity has been related to negative treatment outcomes (Evans et al., 2019). More research examines how internalizing and externalizing symptoms may act as potential risk factors for the development and progression of disordered eating and various ED diagnoses may aid in the development of early detection and intervention efforts.

Psychiatric Diagnoses

Clinical EDs are characterized by high rates of psychiatric comorbidity. Epidemiological research suggests that the lifetime prevalence of any additional psychiatric disorder is between 55 and 90% within ED samples, with binge-eating disorders exhibiting the highest degree of comorbidity (Mitchell et al., 2022). Individuals with EDs often meet the criteria for more than one comorbid disorder (Duncan et al., 2005). The relationship is bidirectional, as individuals with eating disorders are at increased risk for other psychiatric disorders, and those with psychiatric disorders are at increased risk of eating disorders (McGrath et al., 2020; Plana-Ripoll et al., 2019).

One recent study by Convertino and Blashli (2022) examined comorbidities in a US sample of children with eating disorder diagnoses, ages 9 to 10. They found that the most common comorbid disorders were anxiety disorders (71.4%), attention-deficit hyperactivity disorder (47.9%), disruptive/impulse control disorders (45.0%), mood disorders (29.6%), and obsessive-compulsive disorder (28.8%). Other studies have found that major depressive disorder and specific classes of anxiety disorders (i.e., social phobia, agoraphobia, panic disorder) are especially prevalent internalizing comorbidities in disordered eating populations (Gadalla et al., 2008). Additionally, females seeking treatment for depression or anxiety disorders were more likely to have comorbid disordered eating symptomatology than those seeking treatment for other disorders (Garcia et al., 2020).

In older adolescents with EDs above the age of 15, substance use disorders are the most common externalizing comorbidity (Eskander et al., 2020). A recent meta-analysis conducted by Bahji et al., 2019 posed that approximately 1 in 5 individuals with an ED will develop a substance use disorder at some point in their lifetime and roughly 1 in 10 will meet full criteria for a substance use disorder. Results from this meta-analysis highlight that bingeing and purging behaviours are particularly associated with substance use. Further, females with ADHD have been evidenced to be more likely to experience a clinical ED than females without ADHD, especially in BN individuals (Bleck et al., 2014). These comorbidities have been hypothesized to be associated

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

with the impulsive nature of binge eating, and its relationship to the tendency for impulsivity related to both substance use and ADHD. Individuals with EDs have further been found to be at increased risk of all personality disorders, and this risk is comparable among AN and BN cases (Momen et al., 2022).

Recent research has highlighted the impact of comorbid psychiatric disorders on the course and treatment of clinical EDs. Studies have found that individuals with co-occurring mood and anxiety disorders, as well as impulsivity, had more severe ED symptoms and a poorer treatment response compared to those without comorbidities (Fewell et al., 2017; Ho et al., 2011x). This underscores the need for comprehensive assessment and integrated treatment approaches for individuals with comorbid presentations.

Despite the growing body of evidence linking comorbid psychiatric disorders with clinical eating disorders, there is still a gap in the literature regarding the connection between psychiatric diagnoses and sub-syndromal EDs. Further research is warranted to explore this aspect and enhance our understanding of the complex relationship between these groups.

Family Factors

The role of peer and family contexts in the development of eating disorders (EDs) has received significant attention among clinicians and researchers (Tasca, 2019). Growing up in a high-conflict environment has been associated with a higher likelihood of developing EDs, with unresolved maternal trauma and concealed conflict between parents proposed as causal factors for ED diagnoses in females (Ringer & Crittenden, 2007). Low parental care and early childhood trauma have been evidenced to contribute to attachment insecurity, ultimately increasing the risk of EDs (Tasca, 2019). Conversely, positive family functioning has been identified as a protective factor against disordered eating behaviours (Erriu et al., 2020).

Specific parenting practices can also contribute to the risk of developing EDs. Gowers and Shore (2001) found that parents of adolescent girls with diagnosed clinical EDs tended to exhibit higher levels of criticism and express more negative comments about their daughter's weight and shape

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

in early childhood compared to parents of youth without such diagnoses. Parenting behaviours such as high control, emotional over-involvement, overprotection, and/or hyper-criticality have been shown to contribute to the development of EDs in both males and females, by reinforcing perfectionist tendencies and self-criticism related to food and weight concerns (Flett et al., 2002; Soenens et al., 2008). Neglectful parenting has also been related to unhealthy and extreme weight control behaviours, bingeing, bulimia symptoms for both males and females, as well as a lack of proper identification and treatment for EDs (Zubatsky et al., 2015). Treasure et al. (2008) supported this assertion, as parents of youth with undiagnosed disordered eating behaviours displayed lower levels of concern and had less awareness of their youth's eating problems compared to parents of youth with diagnosed eating disorders, and this was true for both males and females.

These findings indicate that parents of youth with formal diagnoses of eating disorders may exhibit specific characteristics, such as heightened criticism, negative comments, emotional over-involvement, and overprotection. In contrast, parents of youth with undiagnosed disordered eating behaviours may demonstrate lower concern and awareness. Understanding these differences can inform prevention efforts by targeting parental factors to facilitate early identification and appropriate treatment processes for youth with disordered eating behaviours but no formal diagnosis.

Peer Relationships

Peer relationships have a strong influence on health-related behaviours during adolescence. While the family is the singular most important socializing agent throughout childhood, adolescence marks a shift in which school and peers become the most influential socializing force (Giordano 2003). A lack of social support has been identified as a major risk factor for disordered eating symptomatology in adolescents (Santos et al., 2007). There are multiple pathways by which this association may occur. First, those who report poor-quality relationships with their peers are more likely to develop internalizing symptoms such as depression and anxiety, which subsequently increases the risk of eating pathology and body dissatisfaction

(Patel et al., 2016; Sharpe et al., 2013;). Second, studies have found that negative friendship qualities (i.e., friend alienation, friend conflict) are related to higher levels of body dissatisfaction and disordered eating in a sample of adolescent females, and this relationship may be mediated by depressive symptoms. Interpersonal conflict at school and weight-related teasing are directly related to body esteem and eating behaviours (Paxton et al., 2006; Schutz & Paxton, 2011). Bullying and frequent teasing, both generally and directly related to weight and body, have been associated with greater disordered eating thoughts and behaviours, depression, anxiety, anger, and decreased self-esteem (Utter et al., 2012).

However, strong friendships are not necessarily a protective factor against disordered eating behaviours or body-related self-esteem. Cance et al. (2014) interestingly found perceived cohesion among classmates to be positively associated with disordered eating attitudes. This result may be explained by the fact that popularity is also associated with disordered eating behaviours; Lieberman et al. (2001) found that girls who were nominated by their peers to be popular were more likely to engage in disordered eating and have lower body esteem.

As disordered eating is highly influenced by peer pressure, the perception of the importance of weight and shape among peers is an important predictor of low self-esteem and disordered behaviours (Schutz & Paxton, 2011). However, few studies to date have examined how peer pressure relates to disordered eating in those with and without formal ED diagnoses.

1.5. Social Developmental Model of EDs

The current study applied the Social-Developmental Model (SDM) of eating disorders (Cance et al., 2014; Catalano & Hawkins, 1996) to identify psychosocial factors associated with the emergence of disordered eating behaviours and their progression to clinical levels. In brief, the SDM reflects specific individual, family, and peer factors that contribute uniquely and cumulatively to the development of disordered eating behaviours in adolescents.

The SDM of EDs suggests that anxious and depressive tendencies increase the risk of ED development, particularly when combined with maladaptive social environments. Specifically,

those with internalizing tendencies who are exposed to family conflict and poor parenting practices at an early age are likely to form poor attachment patterns, which play out in later relationships. The SDM highlights the particular importance of peer networks in the development of disordered eating during adolescence, a stage when peers become crucial socializing agents (Giordano, 2003). Individuals who have developed poor attachment patterns at an early age are more likely to exhibit low peer cohesion and high peer friction at school, further increasing the risk of ED development. The current research utilizes the SDM to explore the presence of internalizing and externalizing tendencies, family conflict, and peer relationships, among three groups: individuals with undiagnosed disordered eating, those with ED diagnoses and non-ED youth seeking treatment for other psychiatric disorders.

1.6. Current study

Unlike prior literature that has primarily explored clinical samples with diagnosed EDs (i.e., Barakat et al., 2023; Ho et al., 2012; Hughes, 2013) or community samples of disordered eating behaviours (i.e., McVey et al., 2005; Puccio et al., 2017; Cleland et al., 2023), this research focuses on a large mental health sample that is not specific to EDs. The study aims to examine the differences in individual, family, and social characteristics that have been identified by the Social Developmental Model as important factors in the development of disordered eating, comparing individuals with and without formal diagnoses.

The study investigates potential psychosocial factors associated with three groups: 1) individuals with sub-syndromal disordered eating behaviours but no formal ED diagnosis (sub-ED); 2) individuals with an ED diagnosis (ED) and 3) age and sex-matched individuals without disordered eating behaviours (non-ED). A comparison is made across various mental health, family, and peer factors using scales and algorithms derived from standard care assessments conducted by mental health agencies across Ontario. Building upon previous research as summarized above, several hypotheses were proposed:

1. Disordered eating behaviours and clinical EDs were hypothesized to be more prevalent in females than males.

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

2. Clinical EDs were hypothesized to be more prevalent in older adolescents, while sub-EDs were expected to be more prevalent in younger adolescents.
3. Sub-clinical ED's were expected to be similar across all marginalization indexes, while clinical EDs were expected to be less prevalent in areas with greater marginalized populations.
4. Disordered eating youth (ED and sub-ED) were expected to present with more internalizing symptoms (e.g., poor mood, anxiety, risk of suicide and self-harm) and a greater number of comorbid psychiatric disorders (specifically anxiety, mood, and substance use disorders), in comparison to non-ED youths.
5. Families of youths with disordered eating (both ED and sub-ED) were expected to exhibit lower levels of parenting strength in comparison to non-ED participants. Clinical ED families were hypothesized to also be characterized by higher levels of family conflict and caregiver distress in comparison to sub-ED families.
6. Disordered eating (ED and sub-ED) was hypothesized to be associated with a higher prevalence of peer conflicts and bullying.

The current exploratory study utilized data from a large suite of comprehensive scales and algorithms available through the interRAI-Child and Youth Mental Health (ChYMH) database. This database includes a wealth of reliable and descriptive information about participating youth's psychological, social, and family functioning. To achieve a more comprehensive understanding of the variables of interest, supplementary items and scales were also included in the analyses. By doing so, the study aims to provide a more detailed depiction of the individual, familial, and peer factors at play, and their relation to pathological eating behaviours and disorders.

CHAPTER 2

2. Methods**2.1. Sample**

The sample consisted of youth receiving mental health services from any agency in Ontario using the interRAI Child and Youth Mental Health Assessment (ChYMH; Stewart et al., 2015) as part of their regular clinical practice. A subsample of clinically referred adolescents who completed the ChYMH as well as the Adolescent Supplement from January 2015 to May 2019 was included in the current study ($N=8620$, $M_{age}=14.97$, $SD_{age}=1.73$, 53.76% female). Children under 12 were excluded from this study.

Data were stratified into three analytic datasets: individuals with clinical eating disorder diagnoses ('ED'), those with disordered eating behaviours but no ED diagnoses ('sub-ED') and age and sex-matched participants without disordered eating behaviours ('non-ED'). The ED group included any participant whose attending physicians indicated the presence of a formal diagnosis of an ED ($n=207$). The sub-ED group included participants from the remaining dataset without a formal ED diagnosis, but who answered "yes" to engaging in one or more of the following disordered eating behaviours in the last 30 days: (1) any instances of binge-eating, purging, or bulimia; (2) fasting or major restriction of diet-excluding religious practices; (3) unrealistic fear of weight gain/ statements that suggest a distorted body image ($n=888$). From the remaining youth with no signs of disordered eating in the last 30 days or ED diagnosis, a multivariate matched sampling method was used to randomly select cases that matched the ED and sub-ED groups by age and sex, according to a 3:1 comparison to group ratio ($n=3285$).

The final sample consisted of 4388 participants, the majority of whom were classified as female in biological sex (78.7%) and gender (80.0%). The proportion of individuals who endorsed sex as female in the ED group (84.5%) and sub-ED group (78.9%) did not significantly differ from one another, ($\chi^2 [1, N=1095] = 3.17, p=.07$).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

. The proportion of individuals identifying as female gender in the ED group (83.0%) and sub-ED group (77.5%) also did not significantly differ from one another, ($\chi^2 [1, N=1095] = 3.17, p=.06$). As the proportion of sex and gender variables did not significantly differ from one another and less than 1% of participants indicated their sex and gender was anything other than male or female, the cisgender binary variable of sex (female/male) was used in subsequent analyses. The average age of the final sample was 15.4 years (SD=1.59), and most participants were in the “older adolescent” group (71% older adolescents). The proportion of those in the ED group (75.9%) and the Sub-ED group (69.7%) did not significantly differ, ($\chi^2 [1, N=1095] = 3.02, p=.09$).. The age, gender, and sex of participants in each group are outlined in *Table 1*.

Table 1

Descriptive Variables: Age and Sex in the Total Sample, ED, and Sub-ED groups

	Total Sample	Group		χ^2 value	p value
		ED	Sub-ED		
	<i>N</i> =4388	<i>n</i> =207	<i>n</i> =888	DF=2	
				<i>N</i> =4380	
Sex:					
Male	21.3%	15.6%	20.9%	3.17	.07
Female	78.7%	84.5%	78.9%		
Other	<1%	<1%	<1%		
Gender:					
Male	19.9	16.4%	22.5%	3.59	.06
Female	80.0	83.6%	77.5%		
Other	<1%	< 1%	< 1%		
Age:					
Mean (SD)	15.3 (1.6)	15.6 (1.48)	15.3 (1.59)	3.02	.09
<12	<1%	<1%	<1%		
12 to 14	29%	24.2%	30.1%		
15+	71%	75.9%	69.7%		

Note: p-values of >.001 indicate no significant differences between ED and sub-ED groups on sex, gender, or age group

2.2. Measures

InterRAI-ChYMH

The interRAI Child and Youth Mental Health Assessment (ChYMH) is a semi-structured, interview-based assessment tool designed for clinical use in community-based or inpatient/residential service settings. Developed for use with children and youth between the ages of 4 and 18, the interRAI ChYMH includes 400 items, divided into 22 subsections, to evaluate children and youth's physical and mental health (Stewart et al., 2015). The ChYMH provides a comprehensive summary of each child/youth's specific areas of risk, strengths, and levels of functioning. To inform assessments, information is gathered from various sources, including interviews with the child/youth themselves, family members, service providers and educators. Clinical observation and the examination of previous records are also conducted, to allow assessors to gain a better understanding of the broad environmental and individual contexts of the child/youth (Stewart et al., 2015). An adolescent supplement with 44 additional items covering more mature topics (i.e., drugs, alcohol, etc.) is administered to individuals over the age of 12, and to those under 12 who present with behaviours that are common in adolescence.

Although there are some self-report items embedded in the ChYMH, most responses represent the best judgment of the assessor, after collating all available information (e.g., report cards, assessments, clinical notes, observation). Assessments were completed at intake into clinical services by trained assessors, including psychologists, nurses, psychiatrists, speech and language therapists, child and youth workers, developmental social service workers, and social workers. To ensure accurate and standardized responses, all clinicians administering the interRAI ChYMH were required to participate in extensive training sessions along with competency evaluations. Results of the interRAI ChYMH are used to plan treatment, evaluate programs, and determine the allocation of resources.

Completed interRAI ChYMH assessments were given a randomly generated case record number to protect the identity of the child or youth. The deidentified data were then stored on secure

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

web-based software where only authorized individuals may access them. Western University's Research Ethics Board provided approval for the analysis of the data investigated in this study.

The interRAI ChYMH includes scales and algorithms embedded within the instrument to provide information on symptom intensity in a variety of areas and promote evidence-informed clinical decision-making. Rigorous reliability and validity studies have shown robust psychometric properties for all interRAI scales and algorithms (e.g., Stewart & Hamza, 2017; Stewart, Morris, et al., 2019; Stewart, Poss et al., 2019; Hirdes et al., 2020; Stewart & Babcock, 2020; Stewart, Babcock et al., 2020; Stewart, Celebre et al., 2020; Lau et al., 2019, 2021; Li et al., 2021; Stewart et al., 2022). The interRAI website (www.interrai.org) provides more information regarding the interRAI suite of instruments. Only the initial ChYMH assessments conducted by the agency upon intake to mental health services were included in the current study.

Diagnoses

The ChYMH assessment tool includes a section labelled *Diagnostic and Other Health Information*, which collects information from a psychiatrist, psychologist, or attending physician about the presence (or absence) of various diagnoses. Diagnoses are described in the Diagnostic and Statistical Manual of Mental Disorders, Fourth and Fifth Editions, Text Revision (DSM-IV-TR; DSM-V-TR), depending on when assessments were conducted (APA-2000). Applicable provisional diagnoses were selected by assessors, from a pick list of 12 disorders (i.e., eating disorders, reactive attachment disorder, attention deficit hyperactivity, disruptive behaviour disorder, learning or communication disorder, autism spectrum disorder, substance-related disorder, schizophrenia/other psychotic disorder, mood disorder, anxiety disorder, sleep disorder, and adjustment disorder), and ranked according to their importance as a contributing factor to a youth's reason for service. For the current study, the ranking data were then dichotomized, indicating either the "presence" or "absence" of each diagnosis.

Internalizing Scale

The internalizing subscale of the interRAI consists of 12 items, which load onto three factors: anhedonia, anxiety, and depression (Lau et al., 2017). Anhedonia is represented by items such as “withdrawals from activities of interest”, anxiety is represented by items such as “anxious complaints/concerns”, and depression is measured using statements such as “expressions of hopelessness”. Responses to each item range from 0 (not present) to 4 (exhibited daily in the last 3 days, 3 or more episodes or continuously). Ratings on all items were summed, and composite scores ranged from 0 and 48, with higher scores indicating greater frequency and intensity of internalizing symptoms (Cronbach’s $\alpha = .88$). (Lau et al., 2019; Lau et al., 2021). This scale is highly correlated with other standardized measures of internalizing symptoms such as the Child Behaviour Checklist (CBCL) internalizing subscale (Pearson’s $r = .62$), Social Skills Improvement System internalizing scale (Pearson’s $r = .61$), and the Brief Child and Family Phone Interview internalizing scale (Pearson’s $r = .49$), (Lau et al., 2019; Lau et al., 2020; Stewart et al., 2022). Studies using this subscale have found that it adequately captures the symptomatology of youth with both high and low levels of internalizing symptoms, with a cut-off score of 11 (Lau et al., 2019).

Externalizing Scale

The externalizing scale consists of 12 items measuring the frequency of various externalizing symptoms (i.e., behavioural disturbance). Five items were rated on a five-point scale from 0 (not present) to 4 (exhibited daily in the last 3 days, three or more episodes continuously), and seven items were rated on a six-point scale from 0 (never) to 5 (in the last 3 days). Items recorded as 5 were re-coded to 4, and scores on all 12 items were summed, resulting in composite scores ranging from 0 to 48, with higher scores indicating a greater frequency of externalizing behaviours (Lau et al., 2021). This scale has been validated for use with children and youth accessing mental health services and has been demonstrated to have high reliability (Cronbach’s $\alpha = .87$), content representativeness, internal consistency, and structural validity for a two-dimensional model of reactive and proactive externalizing behaviour.

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Lau et al., (2017) demonstrated that the ChYMH externalizing subscale showed strong associations with other externalizing subscales and measures of anger and disruptive behaviour, from various assessment instruments including the Beck Youth Inventories ($p=.433$), Social Skills Improvement System SSIS externalizing subscale ($p = 0.648$), Child and Adolescent Functional Assessment Scale ($p=0.442$), Child Behaviour Checklist ($p = .645$) and a Brief Child and Family Phone Interview, (Pearson's $\rho = 0.442$). Lau et al., (2021) indicated a cut point of 17 indicates high to very high externalizing symptoms, while scores under 17 indicate symptoms that are mild to moderate.

Risk of Suicide and Self-Harm in Kids (RiSsK)

The RiSsK algorithm assists healthcare providers identify children and youth who are at risk of suicide and self-harm. The RiSsK algorithm has a decision tree with six items from the ChYMH assessment and the Depression Severity Index (DSI), including items related to attempts to kill oneself or engage in self-harm behaviours with or without intent to kill oneself, considered self-injury, and indicators that others are worried about the youth's risk of suicide and/or self-harm (Li et al., 2021). There are 20 terminal nodes on the RiSsK decision tree, each of which ranges from 0 to 6, with higher scores indicating a higher level of risk of suicide and self-harm (Stewart, Celebre et al., 2020). The RiSsK has demonstrated strong psychometric properties and applications in clinical settings. Considering the life-threatening nature of self-harm, researchers have identified a cut-point of 2 to be adequate, with a sensitivity of 93 percent and specificity of 61 percent, to indicate clinical levels of risk of suicide and self-harm in clinical populations of children and youth (Stewart, Celebre et al., 2020).

Depression Severity Index (DSI)

Five items of the DSI, originally developed for use with adults, are embedded in the interRAI ChYMH assessment (Perlman et al., 2013). The child/youth's responses were rated by assessors to capture depression symptoms. Items are related to sad or pained facial expressions, negative statements, self-deprecation, expressions of guilt/shame and hopelessness (Li et al., 2021). Items are scored on a scale of 0 ("not present") to 3 ("exhibited daily in last 3 days") and summed to

create a score up to 15 (Li et al., 2021). Existing research found that this scale has good inter-rater reliability and high inter-item correlations, as well as strong convergent validity when tested against measures of related constructs such as self-injury attempts and suicide (Li et al., 2021). Studies using the interRAI assessment data have used a cut-off score of 3.0 on the DSI scale, which corresponds to a sensitivity range of 73.6 to 81.5% and a specificity range of 46.2 to 55.7% when predicting a clinical level of risk of self-injury (Li et al., 2021).

Anxiety Scale

The Anxiety Scale consists of five items and assesses the frequency of anxiety symptoms including repetitive anxious concerns, unrealistic fears, obsessive thoughts, compulsive behaviour, intrusive thoughts, flashbacks, panic episodes, and nightmares (Stewart et al., 2020). Each item was assessed on a four-point scale, from 0 (not present) to 4 (exhibited daily in the last 3 days, three or more episodes or continuously) and total scores ranged from 0 to 28 with higher scores indicating greater levels of anxiety (Stewart et al., 2020). The Anxiety Scale exhibits reliable internal consistency of the scale, (Cronbach's alpha of .81), as well as moderate-to-strong convergent validity with similar relevant scales such as the Child Behaviour Checklist (CBCL) internalizing subscale (Pearson's $r=.44$) and the BASC-3 anxiety scale, (Pearson's $r = .52$). A cut-point of 5 was used, corresponding to that indicated by Stewart, Babock and Dave (2020) to demonstrate sensitivity ranging from 70.4 to 81.5% and specificity ranging from 44.8 to 62.1% when predicting clinical levels of internalizing symptoms on the CBCL internalizing subscale.

Family Functioning (CY-FFS)

The family functioning index includes six dichotomous items measuring the level of functioning present in the family. Items were scored to represent the presence or absence of 6 indicators of family functioning (i.e., strong, and supportive relationship with family, family is persistently hostile or critical of the child, family members report feeling overwhelmed by the child, parent mental health issues, sibling mental health issues, parents are unwilling or unable to continue to care for the child).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

The family functioning index was originally scored from 0 to 6 with higher scores being indicative of weaker family functioning. For the analyses in this study, as was done by Sun (2016), this scale was used to create a family functioning index with the following values: “0-No Family Functioning Problem” (if scored 0 on the family functioning scale) or “1-Presence of Family Functioning Problem” (if scored 1-6 on the family functioning scale”). Family functioning problems as indicated by this index are related to internalizing symptoms, peer problems and school disengagement (Sun, Semovski & Stewart 2021).

Caregiver Distress

The caregiver distress scale consists of three questions related to well-being, including whether the parent had experienced major life stressors in the past 90 days, was unable or unwilling to continue in caring activities, or expressed feelings of distress, anger, or depression. Using longitudinal data from mental health agencies across Ontario, the caregiver distress scale is a reliable and valid measure of ongoing caregiver distress, and a good predictor of new caregiver distress (Stewart, Toohey & Poss, 2021). Past studies have indicated that those with high levels of caregiver distress are those who indicate “yes” to all 3 items of the caregiver distress scale, and high distress has been found to associate with care recipient depression and caregiver feelings of loneliness and poor self-esteem (i.e., Betini, 2017).

Parenting Strengths

The parenting strengths scale consists of six items associated with strengths that the parent is exhibiting in parenting activities (i.e., ability to communicate effectively with child/youth, assisting child/youth with the regulation of emotions, using appropriate disciplinary practices, demonstrating warmth and support, appropriate supervision, and monitoring, and uses appropriate limit-setting and expectations). This scale has been found to demonstrate high internal consistency (Cronbach’s $\alpha = .88$) and high criterion validity (Stewart et al., 2022). Scores of 0-2 on this scale have been evidenced to indicate strong parenting strengths (Stewart & Poss, 2019) with higher scores on the Parenting Strengths scales as indicative of more problematic parenting.

Peer Conflict

The Peer Conflict Scale measures the level of conflict with friends. Three items measure: conflict with or repeated criticism of close friends, friends who are persistently hostile or critical of child/youth, and pervasive conflict with peers (excluding close friends). Scores range from 0 to 3, with higher scores indicating a greater risk of conflict with friends, and scores of 2 or above indicate high to very high levels of peer conflict. Past research has demonstrated strong convergent validity of these clinician-rated items when compared to measures of related constructs such as school bullying, school problems and the depression severity index (Stewart & Hamza, 2017; Stewart et al., 2019; Li et al., 2021).

Ontario Marginalization Index (ON-Marg)

The Ontario Marginalization Index is a widely used Area Based Deprivation Index which was first developed using Canadian Census data based on 42 variables associated with marginalization (Matheson et al., 2021). These variables were subsequently used to compute four indices representing residential instability, material deprivation, dependency, and ethnic concentration. The residential instability index includes indicators such as the percentage of individuals living alone, and the percentage of dwellings not owned. The material deprivation index includes indicators such as percentage of unemployment and the percentage without a high school degree. The dependency index includes indicators such as the percentage of seniors and those not participating in the labour force. The ethnic concentration index includes indicators such as such percentage of recent immigrants and the percentage who self-identify as a 'visible minority' (defined by Statistics Canada, 2016).

The 2016 census data was used as it is the most current available, in which the ON-Marg index was calculated at the dissemination area (DA) level. DAs are small and relatively stable geographic units with an average population of 400 to 700 persons. The interRAI-ChYMH dataset used in this study was indexed using the first three digits of each child/youth's postal code (Forward Sortation Area, FSA), which is reflective of a larger area of residency, averaging around 25,000 persons. A geo-linking process was applied to distribute the 18,892 DAs in the

Ontario Marginalization public dataset to their most appropriate FSA match, thus giving average values for each of 523 FSA's of the marginalization indices described above (PCCF, Reference Guide, 2017). Index values were split according to provincial quintile indicating level of marginalization to be analyzed as an additional variable in the context of the current study.

2.3. Analytic Strategy

The dataset was first cleaned to include only participants who had received the initial assessment on the interRAI ChYMH along with the Adolescent Supplement. Preliminary analyses were conducted to investigate the prevalence of an ED diagnosis and each disordered eating behaviour (i.e., binge-eating/purging, fasting, fear of weight gain) within the sample of treatment-seeking youth. Adolescents were split according to age, with older adolescents above the age of 15 and younger adolescents below 15. Chi-squared tests of independence were conducted to determine whether disordered eating behaviours differed as a function of age group and sex (M/F).

A simplified matched case sampling procedure was then conducted to ensure that the comparison group consisted of participants of similar age and sex to those presenting with disordered eating, with a ratio of 3:1 (Diseker, 2004). In other words, every adolescent with at least one disordered eating behaviour and/or ED diagnosis was randomly matched with 3 non-ED behaviour adolescents according to age and sex, creating the study's comparison group. This matching method has been used in previous studies using interRAI data (Stewart et al., 2022). The data were then stratified into three groups of participants: those with a formal diagnosis of an ED, those with at least one disordered eating behaviour but no formal diagnoses, and those in the age and sex-matched comparison cohort. The prevalence of various demographic variables was compared among the 3 groups.

The prevalence of each of the 11 additional classified diagnoses was examined in each of the three groups and chi-squared tests were used to identify significant differences. Outcome measures included scores on various scales for self-reported symptoms of anxiety, risk of self-harm, depression, internalizing and externalizing symptoms, family functioning, caregiver

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

distress, parenting strengths, peer conflict and bullying, which were dichotomized according to appropriate cut-offs.

To examine patterns in the data, dichotomous variables were compared using chi-squared tests of independence to indicate if there was a significant difference in the proportion of participants in each group on each outcome measure. P-values of <0.001 were determined to denote statistical significance of overall chi square analyses to control for type I errors, considering the current study ran several statistical analyses increasing risk of error. Once a significant finding had been established, post hoc pairwise comparisons were conducted to identify specific areas of significance. In these cases, a chi square test was conducted for each possible 2x2 group pairing and a Bonferroni-adjusted p-value of $p < .0001$ was used to limit risk of detecting a false positive (type I error). Additional analysis was undertaken to determine if statistically significant findings were also clinically significant. While statistical significance indicates that the observed results are unlikely to occur by chance, clinical significance assesses whether these results have practical or meaningful implications in real-world settings or have a noticeable impact on the individuals or population being studied (Sharma, 2021). Findings with small to large effect sizes based on Cohen J. (1998) for statistical analyses with 2 degrees of freedom (Cramer's $V \geq 0.1$) should be considered clinically significant and were analyzed in more detail. Findings with small effect sizes should be noted, but caution should be applied when drawing meaningful conclusions. SAS version 9.4 was used for all analyses.

2.4. Results

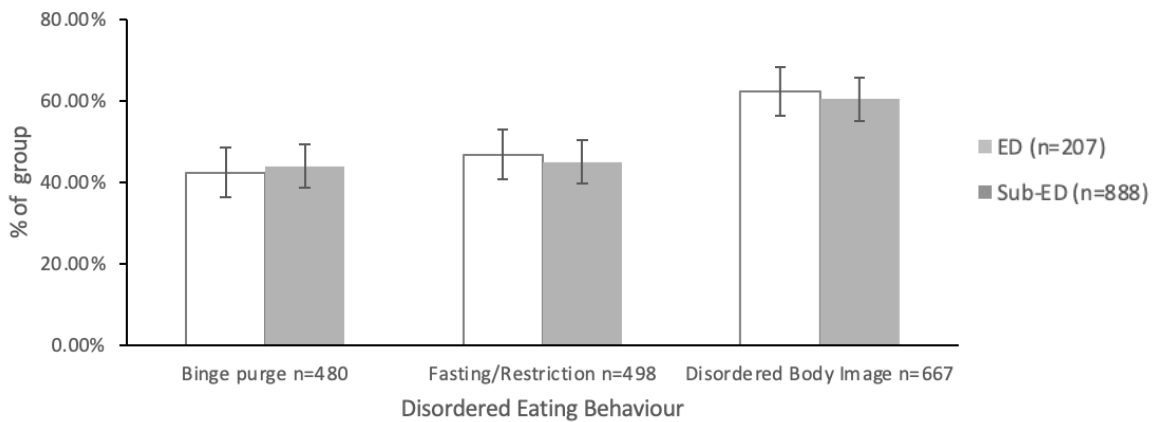
First, the nature of participants' specific disordered eating behaviours was examined. In the 30 days prior to the assessment, a total of 480 participants engaged in at least one instance of binge eating, purging, or bulimia. The prevalence of endorsing these behaviours was similar in the ED group (42.51%) compared to the sub-ED group (44.14%), $\chi^2 [1, N=1097] = .18, p = .67$. A total of 498 participants indicated fasting or major restriction of diet, excluding for religious purposes, within the last 30 days. Fasting/major restriction of diet were reported in a similar proportion of those with EDs and sub-EDs, ($\chi^2 [1, N=1097] = .22, p = .01$), in 46.86% of the EDs group and

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

45.05% of the sub-ED group. 667 participants in total endorsed statements to suggest disordered body image. Body image concerns were reported in 62.32% of those with formal EDs and 60.47% of the sub-ED group, proportions that do not significantly differ ($\chi^2 [1, N=1097] = .24, p = .62$).

Figure 1

Prevalence of Each Disordered Eating Behaviour by Group



When examining differences in demographic variables, it was revealed that all three groups (ED, sub-ED and non-ED) consisted of primarily English language speakers and individuals who lived with their parent(s)/primary caregivers. The proportion of those in the two highest quintiles for economic instability, material deprivation, and dependency marginalization indices did not differ between the three groups. However, a significant difference in ethnic/cultural diversity was found, with a small effect size, $\chi^2 (2, N=4380) = 13.77, p=.001$. Post-hoc pairwise comparisons revealed no significant difference in the proportion of individuals from areas in the high quintile of ethnic marginalization between the ED group and the non-ED group, ($\chi^2 [1, N=3492] = 6.56, p=.01$). The sub-ED group and the non-ED groups also did not significantly differ $\chi^2 [1, N=4173] = 5.73 p = .02$). The only significant difference indicated that the ED group included a greater number of individuals with high ethnic marginalization indices, compared to the sub-ED group ($\chi^2 [1, N=1095] = 12.19, p=.0005$), although this effect did not meet Bonferroni-adjusted cut-off.

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Table 2

Demographic Variables by Group

	Groups			χ^2	<i>p</i> value (Cramer's V)
	ED <i>n</i> =207	Sub-ED <i>n</i> =888	Non-ED <i>n</i> =3285		
				Df= 2 N= 4380	
Language:					
English	94.2%	97.5%	95.6%	.88	.65
French	3.4%	1.4%	2.7%	2.04	.31
Other	2.4%	1.1%	1.7%	.74	.69
Living Arrangements:					
Alone	<1%	1.9%	1.1%	3.92	.12
With parent(s) or primary caregiver(s)	92.3%	87.5%	88.1%	3.94	.14
With sibling(s), no parent(s)/ primary caregiver(s)	<1%	<1%	<1%	--	--
With other relative(s)	1.45%	3.15%	3.5%	2.57	.27
With foster family	1.9%	2.25%	2.6%	1.56	.45
With non-relative(s)	2.4%	4.72%	4.4%	2.21	.34
Marginalization index:					
High** instability (%)	34.78%	39.44%	37.9%	1.63	.44
High** deprivation (%)	41.06%	39.55%	39.55%	5.47	.06
High** dependency (%)	45.4%	40.2%	40.6%	1.85	.39
High** ethnicity (%)	20.7%⁺	33.26%⁺	29.1%	13.77	.001 (.06)

**Proportion of assessments falling in the two highest provincial quintiles of the marginalization indices
+ Significant difference between ED and Sub-ED groups using and adjusted cut-off value of $p < .0001$.

Table 4 includes the rates of the 11 additional DSM-classified diagnoses, excluding eating disorders (EDs). A significant chi-square test revealed a difference in the proportion of individuals with anxiety disorders across the three groups, $\chi^2 (2, N=4380) = 126.41, p < .0001$. Bonferroni-adjusted *p*-values of .0001 were used for pairwise comparison post hoc tests to identify specific group differences. The prevalence of anxiety diagnoses was significantly higher in the ED group compared to both the sub-ED group ($\chi^2 [1, N=1097] = 80.17, p < .0001$, Cramer's V = .26) and the non-ED group ($\chi^2 [1, N=3492] = 124.35, p < .0001$, Cramer's V = .19). However, the sub-ED and non-ED groups did not significantly differ in the proportion of anxiety disorder diagnoses ($\chi^2 [1, N=4173] = 7.82, p = .005$).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

There was also a significant difference in the proportion of mood disorders across the groups ($\chi^2 [2, N=4380] = 132.37, p < .0001, \text{Cramer's } V = .17$). A greater proportion of individuals with diagnosed EDs had mood disorders compared to both the sub-ED group ($\chi^2 [1, N=1095] = 80.17, p < .0001, \text{Cramer's } V = .20$) and the non-ED group ($\chi^2 [1, N=3492] = 116.33, p < .0001, \text{Cramer's } V = .18$). Notably, when using the rigorous Bonferroni-adjusted cut-off, the sub-ED and non-ED groups did not significantly differ in the proportion of mood disorder diagnoses ($\chi^2 [1, N=4173] = 11.20, p = .0012$).

Sleep disorders exhibited differential prevalence among the groups with a moderate to large effect size ($\chi^2 [2, N=4380] = 173.94, p < .0001, \text{Cramer's } V = .20$). Specifically, sleep disorders were diagnosed in over 20% of the ED group, less than 3% of the sub-ED group ($\chi^2 [1, N=1095] = 100.63, p < .0001, \text{Cramer's } V = .30$), and 2.5% of the non-ED group ($\chi^2 [1, N=3492] = 155.84, p < .0001, \text{Cramer's } V = .21$). There was no significant difference in sleep disorder prevalence between the sub-ED and non-ED groups ($\chi^2 [1, N=4173] = .79, p = .37$).

A significant difference in the proportion of substance-related disorders (SUDs) across groups was found with a small effect size ($\chi^2 [2, N=4380] = 16.60, p < .0001, \text{Cramer's } V = .06$). Patterns indicated that SUDs were most prevalent in the ED group, followed by the sub-ED group, and were least common in the non-ED group. Post hoc pairwise comparisons using Bonferroni-adjusted p-values revealed that the ED group significantly differed from the non-ED group in the proportion of SUDs diagnosed ($\chi^2 [1, N=3492] = 16.64, p < .0001, \text{Cramer's } V = .07$). However, this difference was not statistically significant between the ED and sub-ED groups ($\chi^2 [1, N=1095] = 7.45, p = .006$), or between the sub-ED and non-ED groups ($\chi^2 [1, N=4173] = 1.30, p = .25$).

Adjustment disorders were most prevalent in the ED group, followed by the sub-ED group, and least common in the non-ED group, with a small effect size ($\chi^2 [2, N=4380] = 23.96, p < .0001, \text{Cramer's } V = .07$). Pairwise comparisons indicated that the effect was most significant between

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

the ED and non-ED groups ($\chi^2 [1, N=3492] = 17.01, p < .0001, \text{Cramer's } V = .07$). A sub-threshold difference was found with more sub-ED participants having adjustment disorders than the non-ED group ($\chi^2 [1, N=4173] = 11.20, p = .0005$). No significant difference was found between the sub-ED and sub-ED groups ($\chi^2 [1, N=1095] = 2.58, p = .11$).

Table 3

Presence of 11 Additional DSM-IV Diagnoses

	Group			χ^2	<i>p</i> -value (Cramer's V)
	ED	Sub-ED	Non- ED		
	<i>n</i> =207	<i>n</i> =888	<i>n</i> =3285	Df= 2 N= 4380	
Anxiety disorder	81.6%^{**}	47.2%⁺	42.9%	126.41	<.0001 (.17)
Sleep Disorder	20.8%^{**}	2.5%⁺	2.9%	173.95	<.0001 (.20)
Mood disorder	61.4%^{**}	36.1%⁺	27.4%	132.37	<.0001 (.17)
ADHD	25.6%	24%	23.2%	0.32	.66
Learning disorder	15.9%	12.9%	12.8%	1.28	.43
Disruptive behaviour disorder	12.1%	11.2%	10.6%	0.83	.72
Adjustment disorder	9.2%[*]	6.1%	3.6%	23.96	<.0001 (.07)
Substance-related disorder	7.3%[*]	3.2%	2.5%	16.60	.0002 (.06)
Autism disorder	3.4%	3.4%	4.9%	6.23	.11
Reactive attachment disorder	2.4%	1.1%	1.5%	2.14	.36

* Significantly different from non-ED comparison group using a Bonferroni-adjusted cut-off of $p < .0001$, following pairwise comparisons

⁺ Significant difference between ED and Sub-ED groups using a Bonferroni-adjusted cut-off value of $p < .0001$, following pairwise comparisons

In Table 5, an overview of various mental health factors is presented, represented by scores on measures and scales that were dichotomized based on predefined cutoff values. It is noteworthy that most symptoms had similarly higher prevalence in both the ED and sub-ED groups than in the non-ED group.

A significant difference in the prevalence of internalizing symptoms was observed across groups ($\chi^2 [2, N=4380] = 222.54, p < .0001, \text{Cramer's } V = .22$). The ED group exhibited a higher prevalence of high internalizing symptoms compared to the non-ED group ($\chi^2 [1, N=3492] =$

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

51.19, $p < .0001$, Cramer's $V = .12$). Similarly, the sub-ED group also had a higher proportion of youth with high internalizing symptoms compared to the non-ED group ($\chi^2 [1, N=4173] = 197.07$, $p < .0001$, Cramer's $V = .22$). However, the ED and non-ED groups did not significantly differ in the prevalence of internalizing symptoms ($\chi^2 [1, N=3492] = 0.20$, $p = .65$).

The prevalence of externalizing symptoms significantly varied across groups ($\chi^2 [2, N=4380] = 27.61$, $p < .0001$, Cramer's $V = .08$), with a small effect size. A greater proportion of individuals in the sub-ED group exhibited externalizing symptoms compared to the non-ED group ($\chi^2 [1, N=4173] = 27.56$, $p < .0001$, Cramer's $V = .08$). However, there were no significant differences in the proportion of externalizing symptoms between the ED group and either the sub-ED group ($\chi^2 [1, N=3492] = 0.79$, $p = .37$) or the non-ED group ($\chi^2 [1, N=1095] = 2.78$, $p = .09$).

High scores on the Depression Severity Index (DSI) were significantly different across groups ($\chi^2 [2, N=4380] = 153.54$, $p < .0001$, Cramer's $V = .19$). The ED and sub-ED groups did not significantly differ in the prevalence of individuals with high depression severity ($\chi^2 [1, N=1095] = 0.18$, $p = .67$). However, compared to the non-ED group, both the ED group ($\chi^2 [1, N=3492] = 38.58$, $p < .0001$, Cramer's $V = .10$) and the sub-ED group ($\chi^2 [1, N=4173] = 126.16$, $p < .0001$, Cramer's $V = .17$) had a higher proportion of participants with high depression severity.

A chi-squared analysis of independence revealed significant differences across groups in anxiety levels ($\chi^2 [2, N=4380] = 128.62$, $p < .0001$, Cramer's $V = .17$). The ED and sub-ED groups did not significantly differ in the prevalence of individuals with high anxiety ($\chi^2 [1, N=1095] = 0.85$, $p = .36$). However, compared to the non-ED group, both the ED group ($\chi^2 [1, N=3492] = 39.66$, $p < .0001$, Cramer's $V = .11$) and the sub-ED group ($\chi^2 [1, N=4173] = 101.87$, $p < .0001$, Cramer's $V = .16$) had a higher proportion of participants with high anxiety.

In addition, groups differed in the proportion of individuals at high risk of self-harm ($\chi^2 [2, N=4380] = 119.31$, $p < .0001$, Cramer's $V = .16$). The ED and sub-ED groups did not significantly differ in the prevalence of individuals at high risk of self-harm ($\chi^2 [1, N=1095] =$

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

0.30, $p = .58$). However, more participants in the ED group ($\chi^2 [1, N=3492] = 31.28, p < .0001$, Cramer's $V = .09$) and the sub-ED group ($\chi^2 [1, N=4173] = 96.74, p < .0001$, Cramer's $V = .15$) were at high risk of self-harm compared to the non-ED group.

Self-reported mood issues significantly differed across groups ($\chi^2 [2, N=4380] = 101.01, p < .0001$, Cramer's $V = .15$). The ED and sub-ED groups did not significantly differ in self-reported mood issues ($\chi^2 [1, N=1095] = 1.88, p = .17$). However, when compared to the non-ED group, both the ED group ($\chi^2 [2, N=3492] = 38.87, p < .0001$, Cramer's $V = .10$) and the sub-ED group ($\chi^2 [1, N=4173] = 75.26, p < .0001$, Cramer's $V = .13$) had higher proportions of individuals with mood issues.

Self-reported sleep issues also significantly varied across groups ($\chi^2 [2, N=4380] = 96.41, p < .0001$, Cramer's $V = .15$). The ED and sub-ED groups did not differ in self-reported sleep issues ($\chi^2 [1, N=1095] = 0.029, p = .86$). However, both the ED group ($\chi^2 [1, N=3492] = 20.04, p < .0001$, Cramer's $V = .08$) and the sub-ED group ($\chi^2 [1, N=4173] = 8.46, p < .0001$, Cramer's $V = .14$) reported more poor sleep compared to the non-ED group.

Self-reported health issues were prevalent among individuals with EDs ($\chi^2 [2, N=4380] = 80.30, p < .0001$, Cramer's $V = .14$). Specifically, the ED group demonstrated similarly high proportions of self-reported health issues as the sub-ED group ($\chi^2 [1, N=1095] = 6.27, p = .01$). The non-ED comparison group had a lower proportion of self-reported health issues compared to both the ED group ($\chi^2 [1, N=3492] = 58.95, p < .0001$, Cramer's $V = .13$) and the sub-ED group ($\chi^2 [1, N=4173] = 44.17, p < .0001$, Cramer's $V = .10$).

Self-reported feelings of not belonging also varied across the three groups ($\chi^2 [2, N=4380] = 164.34, p < .0001$, Cramer's $V = .19$). Pairwise comparisons indicated that there were no significant differences in self-reported feelings of not belonging between the ED and sub-ED subgroups ($\chi^2 [1, N=1095] = .86, p = .35$). The more likely to report feelings of belonging

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

compared to both the sub-ED group ($\chi^2 [1, N=4173] = 148.85, p < .0001, \text{Cramer's } V = .19$) and the ED group ($\chi^2 [1, N=3492] = 30.61, p < .0001, \text{Cramer's } V = .09$).

Table 4.

Individual factors: Dichotomized Scales and Individual Items

	Group			χ^2	p-value (Cramer's V)
	ED <i>n</i> =207	Sub-ED <i>n</i> =888	Non-ED <i>n</i> =3285		
				Df= 2 N= 4380	
Internalizing Scale (17+)	49.3%*	51.1%*	26.5%	222.54	<.0001 (.22)
Anxiety Scale (6+)	67.2%*	63.7%*	44.6%	128.62	<.0001 (.17)
DSI (4+)	81.2%*	79.9%*	59.7%	153.54	<.0001 (.19)
Externalizing Scale (11+)	27.5%	33.5%*	25.4%	27.61	<.0001 (.08)
Risk of Self Harm (RiSsk 2+)	33.8*	30.8%*	15.5%	101.87	<.0001 (.17)
Self-Reported (SR) Mood:					
“Anxious, uneasy, restless”	51.7%*	46.5%*	30.8%	119.31	<.0001 (.16)
SR sleep: poor	37.2%*	37.9%*	22.2%	101.01	<.0001 (.15)
SR health: poor	15.0%*	9.1%*	3.5%	80.30	<.0001 (.14)
SR “feeling of belonging”: No	39.6%*	36.0%*	55.5%	164.34	<.0001 (.19)

*Significantly different from the non-ED comparison group using post-hoc pairwise comparisons and a Bonferroni-adjusted cut-off value of $p < .0001$.

Table 5 presents a comparative analysis of family and peer factors among the three study groups. Family Dysfunction exhibited significant differences across the three groups ($\chi^2 [2, N=4380] = 37.49, p < .0001, \text{Cramer's } V = .10$). Families with children displaying disordered eating behaviours (both ED and sub-ED) were more likely to report family dysfunction compared to the non-ED group. However, this difference reached statistical significance only in the sub-ED group ($\chi^2 [1, N=4173] = 32.59, p < .0001, \text{Cramer's } V = .09$) and not in the ED versus non-ED groups ($\chi^2 [1, N=3493] = 7.36, p = .006$). No significant difference in family dysfunction was observed between the ED and sub-ED groups ($\chi^2 [1, N=1095] = 2.78, p = .10$).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Caregiver Distress also significantly differed among the three groups ($\chi^2 [2, N=4380] = 17.99, p = .0001$, Cramer's $V = .06$), with a notable pattern suggesting that caregiver distress was highest in the ED group, lower in the sub-ED group, and lowest in the non-ED group. In comparison to the non-ED group, the ED group had higher caregiver distress levels, although the p-value did not meet the criteria with Bonferroni-adjusted values ($\chi^2 [1, N=3493] = 12.50, p = .0004$). Similarly, the sub-ED group had a greater proportion of high caregiver distress, but it also did not meet the threshold ($\chi^2 [1, N=4173] = 32.59, p = .004$). The ED and sub-ED groups did not significantly differ ($\chi^2 [1, N=1095] = 2.83, p = .09$).

Parenting Strengths displayed significant differences across the three groups ($\chi^2 [2, N=4380] = 22.06, p < .0001$, Cramer's $V = .07$), with a small effect size. Both the ED and sub-ED groups had a greater proportion of parents with poorer parenting practices than the non-ED group, although they did not meet Bonferroni-adjusted p-values, with the ED group at ($\chi^2 [1, N=3497] = 11.44, p = .0007$) and the sub-ED group at ($\chi^2 [1, N=4173] = 13.42, p = .0002$). There was no significant difference in parenting strengths between the sub-ED and ED groups ($\chi^2 [1, N=1095] = 1.64, p = .20$).

The prevalence of high peer conflict significantly varied across the groups ($\chi^2 [2, N=4380] = 22.35, p < .0001$, Cramer's $V = .07$). Post hoc tests revealed that peer conflict was higher in the sub-ED group compared to the non-ED group ($\chi^2 [1, N=4173] = 22.08, p < .0001$, Cramer's $V = .07$). However, the ED group did not significantly differ in high peer conflict from the non-ED group ($\chi^2 [1, N=3493] = 1.34, p = .25$). Moreover, there was no significant difference in high peer conflict between the ED and sub-ED groups ($\chi^2 [1, N=1095] = 1.30, p = .26$).

Lastly, a higher proportion of participants in both disordered eating groups (with and without diagnoses) reported being bullied at some point in their lives compared to age and sex-matched participants, with a small effect size ($\chi^2 [2, N=4380] = 22.08, p < .0001$, Cramer's $V = .07$). Post-hoc tests indicated that the ED group did not significantly differ from the non-ED group ($\chi^2 [1, N=3493] = 7.58, p = .006$). In contrast, the sub-ED group reported more instances of bullying than the ED group ($\chi^2 [1, N=4173] = 68.97, p < .0001$, Cramer's $V = .13$). No significant

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

difference was observed in reported bullying between the ED and sub-ED groups ($\chi^2 [1, N=1095] = 2.535, p = .11$).

Table 5
Family Factors, Parenting Strengths, and Peer Factors

	Group			χ^2 value	<i>p</i> -value (Cramer's <i>V</i>)
	ED	Sub-ED	Non-ED		
	<i>n</i> =207	<i>n</i> =888	<i>n</i> =3285	Df = 2 N = 4380	
Family Functioning scale (1+ indicating the presence of family dysfunction)	82.1%*	82.9%*	74.1%	37.49	<.0001 (.10)
Caregiver Distress Scale (3+)	21.7%*	16.7%	12.5%	17.99	.0001 (.06)
Parenting strengths (3+ indicating lower parenting quality)	43.0%*	38.2%	32.15%	22.06	<.0001 (.07)
Peer conflict scale (2+)	15.9%	19.3%*	13.4%	22.35	<.0001 (.069)
Victim of bullying (at least once)	63.8%*	69.55%*	53.3%	22.08	<.0001 (.135)

* Significantly different from the non-ED comparison group using post-hoc pairwise comparisons and a Bonferroni-adjusted cut-off value of $p < .0001$.

CHAPTER 3

3. Discussion

Data informing the current study were drawn from semi-structured interviews conducted using the inteRAI ChYMH assessment tool, a comprehensive suite of scales and algorithms completed by mental health professionals upon intake to mental health services across Ontario, Canada.

Approximately 10% of adolescents in the study's population presented with some type of disordered eating (i.e., bingeing/purging; fasting/major restriction of diet; statements to suggest distorted body image) within 30 days prior to formal mental health assessment. Of those indicating at least one disordered eating behaviour, only 20% had received a formal eating disorder (ED) diagnosis. This study focused on identifying characteristics of the sub-group of treatment-seeking youth who present with disordered eating but have not received a formal ED diagnosis (sub-ED group). By comparing sub-ED youth to those with formal ED diagnoses (ED group) and comparable treatment-seeking youth without disordered eating (non-ED group), this study intended to further our empirical understanding of adolescents with psychosocial impairment associated with disordered eating, but without access to proper identification and treatment.

Demographic variables were analyzed to describe the presentations of disordered eating behaviour in mental health treatment-seeking youth across Ontario, Canada. As hypothesized, most individuals presenting with disordered eating behaviours and formal ED diagnoses were females. Although it was expected that individuals reporting disordered eating would have a formal ED diagnosis by middle adolescence, analyses revealed that both ED and sub-ED groups consisted mainly of youth above the age of 15. It was further hypothesized that undiagnosed disordered eating would be most common in marginalized areas. While the sub-ED group consisted of more individuals from areas with greater ethnic diversity, no differences were found in other area-based measures of marginalization. Subsequent analyses further revealed that disordered eating behaviours presented similarly in individuals with and without formal ED

diagnoses. Specifically, disordered body image was most often reported in both the ED and sub-ED groups.

As the diagnostic criteria for formal ED diagnoses specifically require patients to present with significant psychosocial impairment, researchers hypothesized that the ED group would have a greater prevalence of psychosocial impairment than those without (DSM-V, American Psychiatric Association, 2013). Surprisingly, however, the ED and Sub-ED groups were more similar than they were different in their psychosocial characteristics. When examining findings with moderate to large effect sizes indicating clinical significance, both groups presented with a greater prevalence of internalizing symptoms, anxiety, depression, and risk of self-harm, as well as poor self-reported mental and physical well-being, compared to the age and sex-matched comparison group. There were also more participants in the disordered eating groups (ED and sub-ED) that presented with highly dysfunctional families and experiences of peer bullying compared to the non-ED group. The most significant difference between the disordered eating groups appeared in the prevalence of formal psychiatric diagnoses. Specifically, the ED group had a higher prevalence of co-occurring internalizing disorders (i.e., anxiety disorder and mood disorder) and sleep disorders. Further, small effect sizes revealed that the ED group consisted of more parents with high caregiver distress and poor parenting practices than the non-ED group. Compared to non-ED youth, the sub-ED group presented with more diagnoses of substance-related disorders and substance-related disorders, as well as more externalizing symptoms and peer conflict, all with small effect sizes (see Appendix for a visual representation of findings). The remainder of this discussion will further explain these findings and suggest potential implications for future research directions.

3.1. Disordered Eating Behaviours

The researchers' first objective was to offer an overview of the prevalence of disordered eating behaviours among adolescents seeking mental health treatment in Ontario, Canada. In the entire sample of treatment-seeking youth prior to age and sex-matching, 1130 adolescents reported

some sort of disordered eating, while only 224 of those youth had formal ED diagnoses. This suggests that a large portion of sub-ED youth may not be properly assessed or treated.

Most adolescents with some sort of disordered eating behaviour reported disordered body image and unrealistic fear of weight gain, in comparison to bingeing/purging or fasting/major restriction of diet. Body image issues are becoming increasingly common in adolescents, due to social media use and increased exposure to thin ideals perpetuated by mass media (Vall-Roque et al., 2021). Pubertal transitions affecting body shape, weight, and appearance, accompanied by the frequency of use of social networking sites (especially appearance-focused Instagram accounts) have been linked with a drive for thinness and lower self-esteem (Voelker et al., 2015). These body image issues have been evidenced to directly lead to unhealthy weight control behaviours and are associated with poor mental health factors such as depression, and anxiety.

3.2. Individual Factors

The researcher's second aim was to examine individual and demographic characteristics of youth with disordered eating, to inform efforts to screen for EDs upon access to mental health services across Ontario, Canada.

Sex

Findings revealed a significantly greater representation of female participants in both the ED and sub-ED groups, consistent with previous research documenting eating-disordered behaviours as largely a female phenomenon (Galmiche et al., 2019; Jones et al., 2001). While it was expected that this trend would be more pronounced among the ED group, results were consistent for the sub-ED group as well. The under-representation of males in ED research has been attributed to a variety of factors. First, diagnostic criteria for EDs may primarily focus on behaviours commonly observed in females (e.g., dieting for weight loss), potentially overlooking or downplaying male presentations of eating disorders (e.g., muscle dysmorphia), as evidenced in previous literature (Hailous & Wyssen, 2022). Second, the social stigma surrounding male eating disorders may contribute to under-reporting and under-diagnosing among males (Striegel-Moore

et al., 2009; Hambleton, 2022). More research is needed to clarify how these sex biases play a role in the underdiagnosis of disordered eating, especially among populations of males.

It is important to clarify that this study examined biological sex, which is distinct from gender- a sociocultural construct encompassing roles, behaviours, expressions, and identities (Hyde et al., 2019). It is also crucial to acknowledge that analyses only included cisgender individuals as there was not a statistically significant number of individuals identifying with sex/gender minority in the current population. Nonetheless, recent studies have found an especially high prevalence of lifetime prevalence of eating disorders among sex and gender-minority adults, as disordered eating may be perpetuated by minority stress and discrimination experienced by these individuals (i.e., Nagata et al., 2020). To comprehensively understand the diverse biopsychosocial risk factors associated with disordered eating, future research must integrate both gender and sex perspectives and ensure the representation of diverse populations, including individuals of various gender and sex identities (Breton et al., 2023).

Age

Although it was expected that individuals reporting disordered eating would have a formal ED diagnosis by middle adolescence, analyses revealed that both ED and sub-ED groups consisted mainly of youth above the age of 15. Supporting existing research, the current study indicated that formal eating disorder diagnoses were more prevalent in older adolescents in the middle adolescent age group, above the age of 15 (Galmiche et al., 2019). However, the proportion of individuals presenting with unidentified disordered eating behaviours does not vary significantly according to age group. Although the onset of these behaviours has been evidenced as early as 11 years of age (i.e., Breton et al., 2022; Wilksch et al., 2019), it is possible that they take years to develop into concerning behaviours that may be noticed by others. However, further research using longitudinal data is crucial to make assumptions about the developmental trajectory of disordered eating, and at what point sub-EDs may be diagnosed.

Marginalization

Using an area-based measure of marginalization, the three groups did not significantly differ on most of the indicators of socio-economic marginalization: dependency, residential instability, or material deprivation. However, a greater proportion of individuals in the sub-ED group lived within areas characterized by greater ethnic diversity, in comparison to those with formal ED diagnoses. Although the current study did not examine mechanisms to explain these findings, previous research has suggested that more ethnically diverse populations may experience significant barriers to accessing specialized diagnostic services and stigmatization associated with receiving help for mental health diagnoses (i.e., Ali et al., 2017; Halbestein et al., 2022). Other studies have evidenced health care professional's own biases about the stereotype of eating disorders as affecting primarily white, high SES, individuals. Therefore, when racialized youth show up for services, they are perceived differently and triaged to other services (Gordon et al., 2006). While the ethnicity of a neighbourhood is one possible indicator of what may be going on, the current study could not examine individualized data, due to public health guidelines intended to protect the privacy of participants. Further, we could not release any individualized data related to the demographic information of each participant. Therefore, more research examining the marginalization of participants, and barriers to services within disadvantaged communities, is needed to make conclusive assertions about how marginalization may impact sub-ED groups.

Internalizing and Externalizing Symptoms

Previous research has linked disordered eating to internalizing symptoms, such as anxiety, depression, and suicidal tendencies. Our findings corroborate this connection, as a greater proportion of participants exhibiting one or more disordered eating behaviours demonstrated elevated levels of clinician-rated anxiety, depression, and risk of suicide and self-harm when compared to non-ED treatment-seeking participants. Moreover, a substantial proportion of those with disordered eating self-reported experiencing high anxiety, negative mood, impaired physical health, poor sleep, and feelings of social isolation, further supporting the bidirectional associations between internalizing symptoms and disordered eating behaviours observed in previous studies (Puccio et al., 2017; Thomas et al., 2021). Considering these results, it becomes

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

evident that screening for a constellation of internalizing symptoms should be an integral part of screening for individuals with undiagnosed or subclinical disordered eating behaviours, (Koutek et al., 2016). This would involve assessing for signs of internalizing symptoms such as depression, anxiety, risk of self-harm and emotional distress, along with behaviours related to disordered eating, to identify individuals at risk.

In determining the diagnostic criteria for disordered eating, diagnosticians have traditionally relied on the evaluation of psychosocial impairment (Allen et al., 2013). However, the current study challenges this approach by revealing that the proportion of individuals with disordered eating experiencing various mental health challenges may not differ between those with and without formal ED diagnoses. This observation points towards the existence of other contributing factors, beyond internalizing symptoms, that may lead to the psychiatric diagnosis of an ED. Further research is needed to determine what these underlying factors are, to help refine the diagnostic criteria for EDs.

While internalizing psychopathology is widely recognized as a predominant risk factor for disordered eating, it is important to acknowledge that externalizing behaviours, such as substance use and delinquency, also have been evidenced to be associated with certain disordered eating behaviours such as binge eating and purging (Russon et al., 2019). This study corroborates this finding, revealing that a greater portion of sub-ED participants had high externalizing symptoms compared to both clinical ED and non-ED youth, albeit with a small effect size. This interesting result calls for further investigation into the underlying mechanisms that may contribute to this increased risk of externalizing problems among those with undiagnosed eating disorders.

These findings highlight the importance of expanding the scope of screening efforts for adolescent disordered eating to include externalizing behaviours which may enable early identification and intervention strategies, potentially preventing the escalation of disordered eating. While our study did not explore sex differences in internalizing/ externalizing behaviours, it is important to recognize that internalizing symptoms have been evidenced to be more

prevalent in females, while externalizing symptoms are more common in males (Mitchell et al., 2014). More research is needed to explore the interplay between sex, internalizing/ externalizing symptoms, and the development of disordered eating to gain a better understanding of these relationships.

Psychiatric Comorbidity

This study further explored the presence of psychiatric comorbidity among individuals with disordered eating, considering both those with formal ED diagnoses and those exhibiting sub-ED behaviours. Surprisingly, while poor mental health, such as anxiety and depression, was similarly prevalent in both groups, formal diagnoses of these internalizing disorders (i.e., anxiety and mood disorders) were more prevalent in individuals with comorbid ED diagnoses than those without a diagnosis. Contrary to hypotheses, the sub-ED and non-ED groups did not differ significantly in the proportion of co-occurring diagnoses. This finding is particularly noteworthy as it suggests that the diagnostic process for individuals with disordered eating may not always be driven by the level of psychosocial impairment, but rather influenced by the availability and access to diagnostic services. This aligns with previous research that has indicated individuals receiving one formal diagnosis are more prone to subsequent psychiatric diagnoses (Momen et al., 2020). Momen and colleagues (2020) observed a bidirectional temporal increase in the risk of comorbid diagnoses in both individuals with ED diagnoses and psychiatric disorders, indicating a cyclical pattern of evaluations within clinical samples. Consequently, receiving an ED diagnosis may prompt further assessment for other psychiatric conditions, and vice versa. As a result, there may be an entire population of mental health-seeking individuals who are not receiving proper diagnosis and treatment, despite presenting clinical levels of disordered eating and associated psychosocial impairments. This finding underscores the importance of ensuring comprehensive and accurate assessments to provide appropriate care to those with disordered eating behaviours. More research is needed to examine how higher comorbidity rates in these conditions may influence psychosocial outcomes and to examine how the severity of the symptoms themselves may influence formal diagnoses.

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Although not expected, the current investigation revealed a higher prevalence of sleep disorders in youth with diagnosed EDs, in comparison to the other treatment-seeking groups, with a large effect size. However, self-reported sleep issues were more common among all individuals with disordered eating behaviours, regardless of formal ED diagnoses. This reinforces the notion that one diagnosis may lead to another and serves as a significant early indicator of potential eating disorder issues. Although the relationship between sleep and disordered eating was not initially hypothesized, it is well-documented in ED literature. This connection is often attributed to hormone dysregulation due to malnutrition, as well as the presence of mental health challenges and environmental stressors (Allison et al., 2016; Cooper, 2022). Further research is warranted to explore the impact of different types and degrees of disordered eating behaviours on sleep problems and vice versa, as well as how this interplay influences diagnosis and treatment strategies. Addressing sleep disturbances early during the development of disordered eating may be essential for preventing further exacerbation of symptoms and improving overall treatment outcomes.

Higher rates of substance-related disorders in those with EDs compared to non-ED youth was further demonstrated, but the effect sizes were too small to draw clinically relevant conclusions. However, previous research has demonstrated strong associations between disordered eating, particularly bingeing and purging behaviours, and substance abuse (Buckholdt et al., 2015; Gadalla & Piran, 2007; Hambleton, 2022). The lack of a substantial link in our current study may be attributed to the age range of our sample, which included participants up to and including 18 years old. It is plausible that the association between EDs and substance use becomes more pronounced during later adolescence and adulthood. Further investigation of older populations is needed to validate this hypothesis (Hambleton, 2022). More research with diverse participants is necessary to fully grasp the intricacies of psychiatric comorbidity and its impact on individuals with disordered eating, leading to the development of more targeted and effective supports.

3.2. Family Factors

Using a robust and evidence-based measure of family functioning, this study found that families of individuals with diagnosed eating disorders (EDs) and sub-ED behaviours reported similar levels of dysfunction within the family context, compared to families of non-ED youth. This suggests that a greater proportion of individuals with disordered eating behaviour, regardless of official diagnosis, experienced more conflict, than non-ED youth.

The link between family dysfunction and disordered eating has been consistently highlighted in previous research, with dysfunctional family dynamics amplifying negative emotions and internalizing tendencies in children, increasing the risk of developing disordered eating later on (Le Grange et al., 2010; Kroplewski et al., 2019). Our study adds to this body of research by revealing that family dysfunction is more pronounced in those with any kind of disordered eating (both ED and sub-ED) when compared to other youth seeking mental health treatment without eating issues. This suggests that disordered eating patterns may be specifically related to family dysfunction, distinct from other mental health concerns. While extant literature indicates a relationship between disordered eating and a range of dysfunctional family dynamics, no studies have examined whether these patterns differ in populations without formal diagnoses (Cerniglia et al., 2017; Erriu, 2020). The current study suggests that this difference may not be as significant as one may expect.

Parents of individuals with clinical EDs were rated as engaging in poorer parenting practices than the non-ED comparison group. These patterns suggest that a lack of parenting strengths such as warmth and support, communication, and assistance with emotional regulation, may be related to EDs. This finding is not surprising as poor parenting practices, such as overprotection, lack of family cohesion, and poor conflict resolution have been linked to the development of formal EDs (Kroplewski et al., 2019; Stewart, Chapnik & Poss, manuscript in preparation). However, as the effect of this was very small, and was compared to an already treatment-seeking comparison group, more research is needed to examine which specific parenting practices may be targeted by ED prevention and intervention strategies.

The study findings also revealed that caregivers of individuals with clinical ED reported significantly higher levels of distress compared to non-ED youth, with a small effect size, while the sub-ED group did not significantly differ. This finding emphasizes the unique burdens faced by parents who care for children with acknowledged EDs. Consistent with previous research, it is well-documented that parents of children with mental health conditions, including EDs, often experience heightened distress and psychological burden (Penning and Wu, 2016). These parents may encounter unique challenges in managing symptoms, navigating treatments, addressing family dynamics, and coping with personal emotional tolls (Davidson et al., 2021). Further, caregiver distress has been associated with increased family dysfunction and reduced quality of parenting practices and parent-child relationships (Lin, 2018). Recognizing and addressing these challenges is crucial to providing appropriate support and resources for parents of individuals with EDs. By alleviating caregiver distress and prioritizing mental health, professionals can improve treatment outcomes and create a more supportive environment for families dealing with EDs. A comprehensive approach that addresses caregivers' emotional needs alongside youth treatment fosters better family dynamics and enhances overall care quality (Tafa et al., 2017)

3.3. Peer Factors

The social-developmental model of EDs suggests poor peer relationships are the most influential factor determining the development of eating disorders in adolescence. These findings indicate that sub-ED individuals had greater peer conflict when compared to the non-ED group. This finding suggests that individuals with disordered eating, but no formal diagnoses, may face distinct social challenges. This aligns with previous research that has indicated a link between peer groups characterized by bullying, judgments, and conflict and the presence of disordered eating (Lie et al., 2019; Barakat et al., 2023).

Bullying was found to be significantly more prevalent among participants belonging to both disordered eating groups, regardless of formal diagnoses, in contrast to the non-ED participants. These findings align with previous research that emphasizes the potentially detrimental effects of

bullying, including feelings of isolation and diminished self-esteem, which can contribute to the escalation or exacerbation of eating disorder symptoms (Lie et al., 2019). The results suggest that individuals in the ED and sub-ED groups may encounter distinctive challenges associated with peer conflict and bullying. This underscores the need for future research to delve deeper into these factors and to develop interventions targeting their mitigation. Specifically, interventions aimed at addressing bullying and resolving peer conflicts hold promise in reducing the susceptibility to the development or aggravation of eating disorder symptoms within these populations.

3.4. Clinical Implications

The findings of the current study have several implications for the treatment and support of individuals with disordered eating, both with and without formal diagnoses. The identified patterns can inform case-finding methodology used by the interRAI-ChYMH Assessment System, enabling the identification of youth at risk of disordered eating behaviours and clinical EDs. Utilizing this needs-based approach to care, Collaborative Action Plans (CAPs) derived from this assessment provide evidence-based care planning recommendations for specific presenting problems, assisting mental health assessors in designing effective interventions (Stewart & Hamza, 2017; Stewart, Celebre et al., 2020).

Due to the high psychiatric comorbidity in ED populations, a needs-based trans-diagnostic approach to service should be considered. Addressing numerous co-occurring problems, including disordered eating, anxiety, depression, and sleep issues, alongside ED-specific treatment, has shown to be effective for long-term prevention of eating disorder relapse (Thomas et al., 2020). Findings indicate the importance of identifying sleep issues in individuals with disordered eating given the co-occurring sleep disturbances present in these vulnerable children. The Sleep Disturbance CAP can be utilized to flag youth with symptoms of sleep issues and offer evidence-based interventions such as improving sleep hygiene, relaxation techniques, and addressing underlying mental health challenges that impact sleep (Arbeau et al., 2015; Cooper et al., 2022; Koreshe et al., 2023; Sharma & Andrade, 2012;).

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Adolescents with disordered eating, regardless of formal diagnoses, present with problematic relationships with family members and peers. The Interpersonal Conflict CAP can help identify individuals at risk of disordered eating and provide guidelines for addressing interpersonal conflicts and building coping skills (Stewart & Hamza, 2017; Stewart, Lapshina et al., 2021). Family interventions, such as Family Based Therapy (FBT), are crucial to improve communication, reduce criticism, resolve conflicts within the family system, and ensure active parental involvement in ED recovery (Le Grange, 2005; Rienecke, 2017). This study suggests that all youth presenting with family conflict and disordered eating patterns should be considered for family-based therapeutic modalities to foster a supportive and nurturing environment promoting recovery and reducing the risk of developing clinical eating disorders (Rienecke & Le Grange, 2022). However, due to the scarcity of these services, exploring alternative approaches such as group therapy, individual counseling, or telehealth options may be useful to extend support and therapeutic resources to a broader range of individuals in need. Collaborating with community resources and mental health providers could enhance the accessibility and effectiveness of interventions for families facing ED-related challenges.

Moreover, recognizing and addressing caregiver distress is essential to providing appropriate support and resources to parents and families of individuals with disordered eating (Fox et al., 2017; Rienecke & Le Grange, 2022). The Caregiver Distress CAP offers guidelines for addressing specific caregiver difficulties that may impact the mental health of the young person (Stewart & Hamza, 2017; Sinn et al., 2018). Providing support to caregivers through psychoeducation, coping strategies, and access to counseling services can significantly improve overall care quality and enhance treatment outcomes for disordered eating populations (Hibbs et al., 2015; Whitney et al., 2007).

The Interpersonal Conflict CAP can also be used to identify individuals with social challenges related to peer conflict and bullying, which may increase the risk of disordered eating. Evidence-based interventions to reduce conflict and improve social skills can be provided to these youth (Arbeau et al., 2015). Implementing school-wide and community-level programs targeting

bullying prevention and conflict resolution can create supportive and inclusive environments, reducing the detrimental effects of bullying and preventing the escalation or exacerbation of eating disorder symptoms (Puhl et al., 2016).

3.5. Strengths, Limitations and Research Directions

The current study has several notable strengths that make its findings particularly reliable and informative. One of the major strengths is the use of a standardized and highly validated assessment tool, the interRAI ChYMH, which ensures that the data collected is consistent and can be used to conclude different populations and settings. This tool also covers a broad range of mental health and social domains, providing a more comprehensive understanding of the mental health and well-being of children, and identifying areas that require intervention. Thus, this study can be used to inform Collaborative Action Plans, which are used to identify high-risk individuals and integrate best practice and evidence-based treatment methodologies into care planning protocols. Moreover, the large and diverse sample size of treatment-seeking youth who participated in the study is a significant strength, particularly as eating disorders are relatively rare in the general population. This large sample size also provides high statistical power, increasing the accuracy of the study's findings. Finally, the use of real-world settings, such as clinics, hospitals, and schools, provides external validity to the dataset and reflects the experiences of youth with eating disorders in these settings.

Despite its strengths, the study also has several limitations that must be considered when interpreting the findings. The exploratory nature of the study means that the presented findings should be interpreted with caution, and further research is required to establish any definitive claims about the characteristics of populations of youth presenting with disordered eating behaviours. Additionally, while the study focuses on a variety of characteristics of interest, the factors included are only a small subset and do not represent the entire social and cultural context in which eating disorders develop, and there was limited assessment of psychosocial impairments included. Furthermore, although the comparison group was matched based on age and sex, other factors that may have differentiated the groups, such as socioeconomic status and maternal education level, were not controlled for (Barakat et al., 2023). Due to confidentiality,

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

researchers were unable to include participants' specific demographic and marginalization variables. Additionally, there was no inclusion of non-cisgender sexes, genders, or sexualities. Finally, the study's participants were drawn solely from treatment-seeking adolescents at specific mental health agencies within Ontario, Canada. This limits the generalizability of the findings to youth in other countries with different mental health services or those who do not seek treatment for their eating disorders.

Future research should build upon this study's strengths while addressing its limitations. To maintain confidentiality of participants, the current study was unable to examine all potential demographic variables. Exploring the role of socio-economic status and other demographic factors in disordered eating among youth would provide valuable insights into potential unidentified differences between ED youth with and without formal diagnoses. Further investigation into the effectiveness of various interventions and treatments for eating disorders among youth is necessary to understand how to improve outcomes.

Overall, the current study contributes to a growing body of literature on disordered eating among youth and underscores the need for continued research and intervention efforts in this area. By improving our understanding of the complex clinical and social contexts in which eating disorders develop, researchers and clinicians can work towards developing more effective prevention and treatment strategies to support the health and well-being of affected individuals.

Nonetheless, this study provides a unique contribution to the literature on eating disorders and sub-threshold disordered eating behaviour among adolescents. Findings underscore the importance of early intervention and prevention strategies, particularly for individuals displaying sub-threshold ED behaviours, as this under-researched and underserved group of adolescents exhibit comparable rates of distress and impairment as those with diagnosed EDs. Furthermore, the identification of elevated levels of family dysfunction and caregiver distress in these groups calls for a holistic approach to assessment and treatment, acknowledging the broader familial context. Ultimately, the multifaceted nature of our investigation contributes to a more nuanced understanding of ED and sub-ED phenomena among adolescents, offering critical insights for

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

clinicians, researchers, and policymakers alike. This study underscores the complexity of these conditions and highlights the necessity for proper assessment efforts and tailored interventions that consider not only individual symptoms but also the broader psychosocial context.

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

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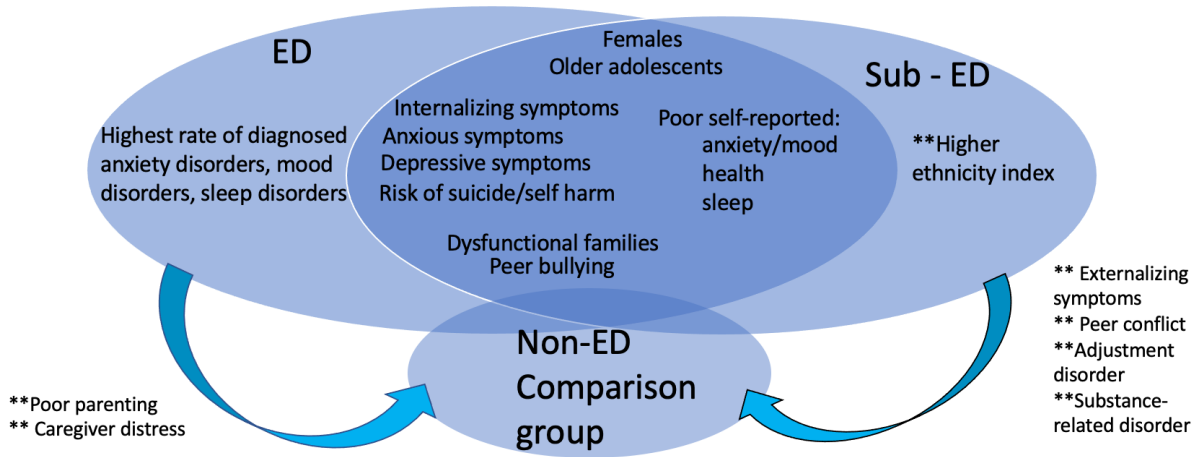
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Appendix

Figure 2

IDENTIFYING FACTORS ASSOCIATED WITH DISORDERED EATING

Significant Key Findings: Visual Representation



**Key findings with small effect sizes