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DISORDERED EATING AMONG ONTARIO ADULTS AND OLDER ADOLESCENTS:
PREVALENCE, CO-MORBIDITIES, AND HEALTHCARE UTILIZATION

by

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Abstract

Research has shown substantial co-morbidities of disordered eating with various psychological and medical indices, including alcohol dependence, substance abuse, affective disorders, depression, physical disabilities, obesity, and diabetes. However, most research on disordered eating and psychological and medical co-morbidities has focussed on adolescent, clinical populations, and has originated from the United States and the United Kingdom. The current study investigated the prevalence and co-morbidities of disordered eating in a non-clinical representative sample of Ontario adults and older adolescents, and addressed the issue of healthcare utilization in this population, by analysing data from the *Canadian Community Health Survey, Cycle 1.2–Mental Health and Well-Being (CCHS 1.2)*. Results indicated a higher level of disordered eating than has been shown in previous studies, and substantial co-morbidities of disordered eating. Results also indicated that many disordered eating individuals did not utilize healthcare services due to negative attitudes toward the healthcare system. Co-morbid respondents were more likely to utilize healthcare services and to report barriers to healthcare services. Treatment options need to address the overlapping nature of disordered eating and other health and psychological factors, and also need to address a more general negative body image, in addition to the more formal problem of disordered eating.

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Disordered Eating among Ontario Adults and Older Adolescents: Prevalence, Co-morbidities, and Healthcare Utilization

Prevalence of Disordered Eating in Ontario

Existing prevalence studies have found low rates of disordered eating in Ontario. In a study of 8,116 individuals across Ontario, lifetime prevalence of bulimia nervosa was 1.1% for females, and 0.1% for males (Garfinkel et al., 1995). Woodside et al. (2001) studied a community sample in Ontario and reported prevalence rates of full syndrome eating disorders (anorexia and bulimia) to be 0.3% for males and 2.1% for females.

Alcohol and Substance Co-Morbidities

Research has shown substantial co-morbidities of disordered eating with various psychological and medical indices. Individuals receiving treatment for eating disorders frequently have high rates of alcohol and substance use (Bushnell, Wells, McKenzie, Hornblow, Oakley-Brown, & Joyce, 1994). In a study by Goldbloom, Naranjo, Bremner, and Hicks (1992), 27% of females with an eating disorder gave psychometric evidence of alcohol dependence. Bulik, Sullivan, Carter, and Joyce (1997) reported that 47% of women with bulimia nervosa had a lifetime history of alcohol dependence. The presence of a lifetime drug or alcohol disorder was reported in 44% of bulimic women in a study by Bushnell et al. (1994).

Correspondingly high rates of eating disorders have been identified among females with alcohol and substance use problems (Walfish, Stenmark, Sarco, Shealy, & Krone, 1992; Wilson, 1992). Goldbloom, Naranjo, Bremner, and Hicks (1992) reported that 30% of females in their sample with alcohol dependence met psychometric cut-off scores for an eating disorder. In a study of psychiatric inpatients, eating disorder diagnoses were distributed significantly more

frequently among females with substance use disorders than among psychiatric controls (Grilo, Levy, Becker, Edell, & McGlashan, 1995).

In a study by Bushnell et al. (1994), bulimic women in the general population had more substance use disorders than general population base rates. A community based study of adolescent girls and women found that disordered eating attitudes were modestly associated with nicotine, alcohol, and drug use in adolescent girls, and alcohol use and misuse in adult women (von Ranson, Iacono, & McGue, 2002). Among male and female adolescents, binge eating has been associated with more problematic and heavier substance use, with few gender differences (Ross & Ivis, 1999). In a study by Welch and Fairburn (1996), community-based women with bulimia nervosa used more illicit drugs than women without bulimia.

Psychological Co-Morbidities

Research has also shown a co-morbidity of disordered eating and mental health issues. Brewerton et al. (1995) studied the co-existence of various psychiatric disorders in patients with bulimia nervosa. The following frequencies of lifetime co-morbid diagnoses were reported: any affective disorder (75%), major depressive disorder (63%), any anxiety disorder (36%), substance use disorder (20%), social phobia (17%), generalized anxiety disorder (12%), and panic disorder (10%) (Brewerton et al., 1995). Bushnell et al. (1994) reported that 84% of bulimic women in a clinical sample had a lifetime affective disorder. Bulimic women in the general population also showed more affective disorders than general population base rates (Bushnell et al., 1994). In a study by Bulik, Sullivan, Fear, and Joyce (1997), co-morbid anxiety disorders were reported in 60% of women with anorexia, and 57% of women with bulimia. Johnson, Spitzer, and Williams (2001) reported that anxiety and mood disorders were much more common

among women with bulimia nervosa.

Research with adolescents has shown that dieting and bulimic symptoms predict depressive symptoms (Stice & Bearman, 2001). In a community based sample, depressive disorders during early adolescence were associated with elevated risk for the onset of eating disorders, dietary restrictions, purging behaviours, and recurrent weight fluctuations (Johnson, Cohen, Kotler, Kasen, & Brook, 2002). In a study by Zaider, Johnson, and Cockell (2002), initial presence of eating disorder symptoms predicted onset or recurrence of depressive disorders. Johnson, Cohen, Kasen, and Brook (2002) prospectively followed adolescents with eating disorders for 8 years and found they were at a substantially higher risk for depressive disorders, anxiety disorders, and suicidal attempts during early adulthood compared to non-disordered peers.

Health Co-Morbidities

Disordered eating has also been shown to be co-morbid with various health problems and chronic disease. Binge eating and purging are more prevalent among diabetic adolescent girls compared to non-diabetic girls (Engstrom et al., 1999; Neumark-Sztainer et al., 1996). Body concerns, binge eating, frequent dieting, vomiting, and laxative or diuretic use are more common among individuals with chronic illness including diabetes, asthma, attention deficit disorder, physical disabilities, and seizure disorders (Neumark-Sztainer, Story, Resnick, Garwick, & Blum, 1995). Johnson et al. (2002) reported that adolescents with eating disorders were at greater risk for developing cardiovascular symptoms, chronic fatigue, chronic pain, limitations in activities due to poor health, infectious diseases, insomnia, and neurological symptoms during early adulthood. Problems with disordered eating (binge eating, vomiting, fasting, strict dieting, excessive exercise) also predicted poor health outcomes regardless of whether a full-blown eating disorder had been

present.

Stice, Cameron, Hayward, Taylor, and Killen (1999) reported that dietary restraint, laxative misuse, and exercise for weight control predicted obesity onset, while vomiting and binge eating predicted elevated growth in relative weight. In a study by Stice, Presnell, and Spangler (2002), binge eating predicted obesity onset in high school girls.

Hypotheses to Explain Co-Morbidities

While the frequent co-morbidity of disordered eating with psychological and physical health indices have been demonstrated, less is known about the basis of the relationships. Hypotheses that have been proposed to explain the relationship between disordered eating and substance abuse focus on either a shared or causal etiological conceptualization (Wolfe & Maisto, 2000). Shared etiological hypotheses suggest a common predisposition for both eating disorders and substance use, while causal hypotheses explore the role of depression, anxiety, and food deprivation on substance abuse by eating disordered individuals (Wolfe & Maisto, 2000).

Personality Hypothesis

One hypothesis based on a shared etiology is the personality hypothesis, which proposes that some individuals have personality traits that predispose them to becoming addicted to both food and alcohol or other drugs (Holderness, Brooks-Gunn, & Warren, 1994). Bulimia and substance abuse have been found to share common elements, including progression of the addictive behaviour, loss of control over the behaviour, preoccupation with the addictive substance, health and family consequences of the disorder, use of the substance to escape from negative emotional states, and immediate gratification followed by long-term harm (Das, 1990; Lesieur & Blume, 1993; Wolfe & Maisto, 2000). However, it is unclear that binge eating fulfills

certain addiction criteria such as tolerance, physical dependence, loss of control, and craving (Wilson, 1993). Furthermore, personality differences have been found between individuals with eating disorders and individuals who are substance abusers. In a study by Owen, Pyle, and Mitchell (1982), female substance abuse inpatients scored significantly higher on most *Minnesota Multiphasic Personality Inventory (MMPI)* subscales and scored significantly higher on the *MacAndrew Alcoholism Scale*, which measures characteristics associated with addiction, compared to a group of bulimic women.

Family History Hypothesis

Another shared etiology conceptualization proposed to understand the relationship between disordered eating and substance abuse is the family history hypothesis (Wolfe & Maisto, 2000). Kasset et al. (1989) reported significantly higher rates of alcoholism among the first degree relatives of bulimics, compared to relatives of a control group. Jonas and Gold (1988) found that adult children of alcoholics have high rates of eating disorders. However, Mintz, Kashubeck, and Tracy (1995) did not find a strong relationship between parental alcoholism and disordered eating in a non-clinical sample. Schuckit et al. (1996) did not find significantly higher rates of eating disorders among relatives of individuals with alcohol dependence, compared to relatives of non-alcohol dependent individuals. In a large-scale female twin study, Kendler et al. (1995), found the genetic influence for alcoholism to be unrelated to genetic factors associated with mood, anxiety and eating disorders.

Developmental Perspective

A developmental perspective on the relationship between disordered eating and substance abuse proposes that some individuals may be particularly sensitive to social pressures to conform

to a thin ideal, and for experimenting with drugs, resulting in an increase in eating disorders and substance abuse (Krahn, Kurth, Demitrack, & Drewnowski, 1992). In a study by Fisher, Schneider, Pegler, and Napolitano (1991), an association was found between dissatisfaction with weight, disordered eating, and the use of alcohol, cigarettes, and other drugs among a group of adolescent females. However, most female adolescents can engage in dieting behaviour and recreational drug use without encountering serious problems, limiting the power of a developmental hypothesis (Wolfe & Maisto, 2000).

Self-Medication Hypothesis

Causal etiologies to explain the relationship between disordered eating and substance abuse include the self-medication hypothesis, which suggests that individuals use alcohol or other drugs to alleviate painful affective symptoms (Wolfe & Maisto, 2000). As previously noted, there are high rates of depression in individuals with eating disorders, and it has been suggested that these individuals use substances to alleviate dysphoria and other depressive symptoms (Peveler & Fairburn, 1990). However, Krahn et al. (1992) did not find an association between self-reported depressed mood and alcohol consumption in a group of college women with eating disorder symptomatology. In a study by Weiss, Griffin, and Mirin (1992), females with and without major depression reported similar self-medicating use of substances.

It has also been suggested that substances are used to alleviate feelings of anxiety and tension, resulting from a co-morbid anxiety disorder, or the eating disorder itself (Wolfe & Maisto, 2000). However, while the use of food to reduce tension in bulimics has been reported (McCormack & Carman, 1989), it is still not clear whether drugs and alcohol serve a similar function, and the hypothesis remains speculative (Wolfe & Maisto, 2000).

Food Deprivation Hypothesis

Another causal etiology to explain the relationship between disordered eating and substance abuse is the food deprivation hypothesis, which incorporates a learning process to suggest that removal of a primary reinforcer (food) leads to increased reinforcement value for other available reinforcers (drugs and alcohol) (Wolfe & Maisto, 2000). It has been suggested that the reinforcing properties of substances are increased during food deprivation because of repeated pairings of internal hunger stimuli and drug reinforcement (Carroll, France, & Meish, 1979). Studies with rats have found that food deprivation results in increased self-administration of substances, including nicotine, cocaine, and amphetamines (Carroll et al., 1979). Research with human subjects has been sparse. However, in a study by Bulik and Brinded (1993), bulimics and control subjects did not increase their alcohol consumption following food deprivation of 19 hours. It may be that a longer food deprivation period is required to produce significant results (Bulik & Brinded, 1993), but ethical considerations may hinder future research using human subjects (Wolfe & Maisto, 2000). Furthermore, if food deprivation is a causal factor leading to substance abuse, anorexics should have comparable or higher levels of substance abuse than bulimics, since anorexics engage in greater food restriction; however, individuals with bulimia display higher levels of substance abuse, and this is not accounted for by the food deprivation hypothesis (O' Brien & Vincent, 2003).

Eating Disorders as Variant of Mood Disorders

Clearly, the relationship between disordered eating and substance abuse is a complex one, and the relationship between disordered eating and other psychological co-morbidities is just as complicated. One hypothesis has been proposed suggesting that eating disorders are an unusual

variant of mood disorders (Hudson, Laffer, & Pope, 1982). This theory implies that the mood disturbance should predate the eating disorder, and research (e.g., Levy & Dixon, 1985) has shown that some individuals have depressive symptoms before their eating disorder, and continue to have depressive symptoms after they no longer display disordered eating. However, after a review of the literature, Levy and Dixon (1985) conclude that due to inconsistent methodology it is still unclear whether eating disorders are a variant of a mood disorder, or if there is some other unknown relationship between disordered eating and depression.

Starvation and Depression

Another hypothesis implicates starvation in the relationship between disordered eating and depression (O' Brien & Vincent, 2003). Starvation can contribute to elevations in corticotropin-releasing hormone (CRH), which may then contribute to depression (Altemus & Gold, 1992). Even intermittent dieting in healthy women, far below starvation levels, can produce affective symptoms similar to those observed in individuals with eating disorders (Laessle, Platte, Schweiger, & Pirke, 1996). However, whether starvation effects are the sole cause of depression, or whether starvation exacerbates a pre-existing predisposition to depression remains unclear (O' Brien & Vincent, 2003).

Research has clearly demonstrated that eating disorders are accompanied by numerous physical and psychological co-morbidities. However, most research on disordered eating and psychological co-morbidity has focussed on clinical samples, while research on the co-morbidity of disordered eating and health risks have targeted adolescent populations. Furthermore, most research is originating from the United States and the United Kingdom. There is a need for research that investigates the co-morbidities associated with disordered eating in a non-clinical

representative sample of Ontario adults and older adolescents. The current study sought to address this issue, as well as the co-variation of disordered eating and healthcare utilization in Ontario.

Research Questions

The following research questions were examined in the current study:

1. What is the prevalence of disordered eating among Ontario adults and older adolescents?
2. Does prevalence vary as a function of demographics including gender, age, and geographical region of Ontario?
3. What are the psychological co-morbidities associated with disordered eating?
4. What are the medical co-morbidities associated with disordered eating?
5. What is the extent of healthcare utilization among eating disordered individuals, and does this vary by gender, age and geographical region of Ontario?

Hypotheses

It was anticipated that disordered eating would be more prevalent among younger adult females, compared to men and to older women. It was further anticipated that eating disordered adults and older adolescents would display a number of psychological co-morbidities (e.g., substance use disorders, mood disorders, and anxiety disorders), and more medical co-morbidities involving chronic disease (e.g., obesity, diabetes, and asthma). Finally, it was anticipated that eating disordered adults with co-morbidities would be more likely to utilize healthcare programs than those without co-morbidities, that utilization would be more likely in more populated areas of Ontario, and that utilization would occur less often among younger individuals.

Method

Database

The *Canadian Community Health Survey, Cycle 1.2–Mental Health and Well-Being (CCHS 1.2; Statistics Canada, 2002)* provided the data for the current study. The *CCHS 1.2* was conducted by Statistics Canada between May 2002 and December 2002 to provide comprehensive data on mental health in Canada (Statistics Canada, 2003a). The *CCHS 1.2* collected information from approximately 37,000 individuals, aged 15 years and older, from all provinces, obtaining data on the mental, physical, and social well-being of the population, the use of mental health services, and the factors that influence health (Statistics Canada, 2003a). One household member was randomly selected from each dwelling surveyed, and was asked to supply basic demographic information on all household residents. Based on this information, a household member was then selected for an in depth interview (Statistics Canada, 2003a).

The majority of interviews were conducted face-to-face, while 14% were conducted by telephone when travel was restricted, or when an individual refused a face-to-face interview (Statistics Canada, 2003a). Respondents were interviewed using the Computer-Assisted Personal Interview (CAPI) method (Statistics Canada, 2003a). A national response rate of 77% was achieved (Statistics Canada, 2003a).

Access to the *CCHS 1.2* data was provided by the Research Data Centre (RDC) at the University of Toronto. To be considered for access to any of the Statistics Canada datasets that the RDC houses, an extensive proposal must be submitted to an RDC committee, which operates under the auspices of the Social Sciences and Humanities Research Council (SSHRC).

Researchers were required to submit to a security clearance, and take a verbal oath that they

would adhere to the ethical procedures set out by the RDC, such as ensuring that no identifying information would be released. All statistical output had to be submitted to an RDC analyst to ensure that no identifying information of individual respondents was contained, and only after this review is the output allowed to leave the RDC premises.

Funding for the author to travel to the RDC was provided by a student research grant from the Ontario Mental Health Foundation (OMHF). The OMHF promotes the mental health of people living in Ontario by supporting the professional development of researchers and by funding mental health research. To qualify for a student researcher award, students submit a detailed proposal of their planned study which undergoes a review process.

Participants

Ontario residents, aged 15 and older, participated in the current study (unweighted $N = 13,184$, weighted $N = 9,655,881$).

Measures

Measures for disordered eating were based on the *Eating Attitudes Test (EAT-26)*; Garner, Olmsted, Bohr, & Garfinkel, 1982). Psychological, substance/alcohol and health variables were based on DSM-IV criteria or, where otherwise indicated, a diagnosis by a participant's own healthcare provider. Healthcare utilization was based on self-reports of consultations with healthcare providers, and various barriers to utilization of services.

Disordered Eating

The dependent variable for the current project was disordered eating attitudes and behaviours. The *CCHS 1.2* contains items from the short version of the *Eating Attitudes Test (EAT-26)*; Garner, Olmsted, Bohr, & Garfinkel, 1982), a standardized measure of symptoms and

concerns characteristic of eating disorders (pp. 187-192 of the survey). The *EAT-26* is highly correlated with the original 40 item *EAT* ($r = .98$) (Garner et al., 1982). This was used to operationally define eating disordered adults and older adolescents, as a score of 21 or higher on the *EAT-26* has been shown to have good specificity and sensitivity for detecting cases of anorexia and bulimia nervosa.

The psychometric strengths of the *EAT-26* have been demonstrated in studies from a variety of populations around the world. In a study of 81 females, Berland, Thompson, and Linton (1986) reported *EAT-26* scores to be correlated with scores on the *Eating Disorder Inventory (EDI)* and *Restrained Eating Inventory (EI)*, suggesting concurrent validity. In a sample of 809 Israeli female soldiers in their late teens, Koslowsky et al. (1992) found the *EAT-26* to be reliable, and significantly correlated with body image, weight, and dietary restriction. Dotti and Lazzari (1998) administered an Italian version of the *EAT-26* to 1,277 high-school students. Ninety-five students with a score of 20 or more, and 40 students with low scores were randomly selected, interviewed, and diagnosed. The *EAT-26* was able to isolate individuals at risk for eating disorders (Dotti & Lazzari, 1998). In a study of 112 grade 7-12 females in Saudi Arabia, the *EAT-26* was reported to be highly sensitive and reasonably specific in differentiating between eating disordered and non-eating disordered groups (al-Subaie et al., 1996).

In a study by Mintz and O' Halloran (2000), the predictive ability of the *EAT-26* to identify individuals with any DSM-IV eating disorder diagnosis and to differentiate them from individuals with no DSM-IV eating disorder was examined. On the basis of clinical interviews, 136 non-clinical women were classified as non-eating disordered (symptomatic and asymptomatic) or eating disordered (Mintz & O' Halloran, 2000). Point-biserial correlations (r) of *EAT-26* scores with group membership (eating disordered or non-eating disordered) was .79 (p

< .01) (Mintz & O' Halloran, 2000). The overall accuracy rate of the *EAT-26* to differentially categorize individuals with and without a DSM-IV eating disorder was 90%, with 77% sensitivity, 94% specificity, 79% positive predictive power, and 94% negative predicative power (Mintz & O' Halloran, 2000). The authors conclude that the *EAT-26* measures the likelihood of having any DSM-IV defined eating disorder, and can be used in non-clinical samples as a general screening measure for eating disorders (Mintz & O' Halloran, 2000).

Demographics

The *CCHS 1.2* contains items measuring demographic information, including sex and age on pp. 3-11. The age distribution is as follows: 15-24 year old age bracket makes up 16% of the sample; 25-44 age bracket accounts for 35.9% of the sample; 45-64 age bracket makes up 27.7% of the sample; and 65 + age bracket accounts for 20.3% of the sample (Canadian Institutes of Health Research, 2003).

Psychological Variables

Substance use

The *CCHS 1.2* contains items which measure alcohol abuse and dependence on pp. 155-165 of the CAPI interview guide. Respondents are classified by the probability of meeting the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994) criteria for alcohol dependence in the 12 months prior to the interview (Statistics Canada, 2003b). Respondents who meet the criteria report at least 3 symptoms related to aspects of tolerance, withdrawal, loss of control, and social or physical problems related to alcohol use (American Psychiatric Association, 1994)). Specific alcohol-related questions include:

- ALC_Q3: “How often in the past 12 months have you had 5 or more drinks on one

occasion?” (p. 155)

- ALD_Q09: *“During the past 12 months/during your life, did you ever find that you had to drink more alcohol than usual to get the same effect or that the same amount of alcohol had less effect on you than usual?”* (p. 160)

CCHS 1.2 items measuring other illicit drug abuse and dependence are found on pp. 166-176, including:

- DRG_Q03: *“How often did you use marijuana, cannabis or hashish in the past 12 months?”* (p. 166)
- DRG_Q25A: *“During the past 12 months/during your life, did you ever need to use more drugs than usual in order to get high, or did you ever find that you could no longer get high on the amount you usually took?”* (p. 170)

Depression

Respondents were classified as meeting or failing to meet the DSM-IV criteria for major depressive disorder. DSM-IV criteria for depression include an extremely depressed mood state that lasts at least 2 weeks, and includes cognitive symptoms such as feelings of worthlessness and indecisiveness, and disturbed physical functions such as altered sleeping patterns and significant changes in weight and appetite, along with a loss of interest and inability to experience pleasure in life (anhedonia), and recurrent thoughts of death, not accounted for by bereavement, the physiological effects of a substance, or a general medical condition (American Psychiatric Association, 1994). The *CCHS 1.2* contains items measuring depressive symptomatology on pp. 44-80. Specific questions on the *CCHS 1.2* which tap into the criteria for depression include:

- DEP_Q01: *“Earlier, you mentioned having periods that lasted several days or longer*

when you felt sad, empty or depressed most of the day. During such episodes, did you ever feel discouraged about how things were going in your life?" (p. 44)

- DEP_Q09: *"Earlier, you mentioned having periods that lasted several days or longer when you lost interest in most things like work, hobbies or other things you usually enjoy. Did you ever have such a period that lasted for most of the day, nearly every day, for 2 weeks or longer?"* (p. 45)

Anxiety

The CCHS 1.2 contains items measuring panic disorder, social phobia and agoraphobia. DSM-IV criteria for panic disorder is a period of intense fear or discomfort, in which at least 4 or more symptoms develop abruptly and peak within 10 minutes, including pounding heart, shortness of breath, feelings of choking, feeling dizzy, feelings of unreality or being detached from oneself, fear of losing control or going crazy, and fear of dying (American Psychiatric Association, 1994). Respondents are classified as meeting or failing to meet these criteria for panic disorder in the 12 months prior to the interview (Statistics Canada, 2003b) Specific questions related to panic disorder are found on pp. 105-123, and include:

- PAD_QO1A: *"Did your heart pound or race?"* (p. 105)
- PAD_QO1J: *"Were you afraid that you might lose control of yourself or go crazy?"* (p. 106)

The DSM-IV criteria for social phobia (social anxiety disorder) is characterized by a marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others; avoidance or anxious anticipation of the social or performance situations interferes significantly with the person's normal routine

and functioning (American Psychiatric Association, 1994). Respondents were classified as meeting or failing to meet these criteria for social phobia. The *CCHS 1.2* items measuring social phobia are found on pp. 124-139. Specific questions include:

- SOP_Q01E: “*Have you ever felt very shy, afraid or uncomfortable when you were performing or giving a talk in front of an audience?*” (p. 124)
- SOP_Q12: “*When you were in this situation/these situations, were you afraid that you might do something embarrassing or humiliating?*” (p. 131)
- SOP_Q16: “*How much did your fear or avoidance of this situation/these situations ever interfere with either your work, your social life or your personal relationships?*” (p. 133)

DSM-IV criteria for agoraphobia is characterized by anxiety about being in places or situations from which escape might be difficult or embarrassing, or in which help might not be available in the event of a panic attack (American Psychiatric Association, 1994). Respondents were characterized by meeting or failing to meet these criteria for agoraphobia. The *CCHS 1.2* contains items measuring agoraphobia on pp. 140-154, and include the following questions:

- AGP_Q01H: “*Did you ever strongly fear being in a department store, shopping mall or supermarket?*” (p. 141)
- AGP_Q13: “*Were you ever unable to leave your home for an entire day because of your fear?*” (p. 146)

Health Variables

Chronic Health Conditions

The *CCHS 1.2* contains items measuring chronic medical conditions on pp. 20-24 of the survey, including questions about asthma, diabetes, high blood pressure, and heart disease. All

questions ask about chronic medical conditions that have been diagnosed by a healthcare professional in a participant's circle of care. Questions asking about individual height and weight are found on pp. 25-28, and can be used to measure body mass index (BMI).

Healthcare Utilization

Respondents were classified based on the following healthcare utilization variables:

- Being hospitalized overnight or longer in lifetime in any type of healthcare facility for problems with emotions, mental health, or use of alcohol or drugs;
- Being hospitalized overnight or longer in the past 12 months in any type of healthcare facility for problems with emotions, mental health, or use of alcohol or drugs;
- Lifetime consultations with any professionals for problems concerning emotions, mental health, or use of alcohol or drugs;
- Lifetime use of any resources (hospitalization, consultation with professional, use of internet support group or chat room, use of self-help group, or use of telephone helpline) for problems with emotions, mental health, or use of alcohol or drugs.

In addition to these measures of healthcare utilization, the following barriers to healthcare utilization were also examined:

- Accessibility barriers (cost, lack of transportation, or issues such as childcare or scheduling);
- Acceptability barriers (where individuals chose not to seek mental health care because of competing demands on their time, or because of their attitudes towards illness, healthcare providers, or the healthcare system);
- Availability barriers (waiting too long for services, services not available in area, or at the

time of need).

The *CCHS 1.2* contains items measuring utilization of mental health services on pp. 201-231, including the following:

- SER_Q002: “*Have you ever been hospitalized overnight or longer in any type of health care facility to receive help for problems with your emotions, mental health or use of alcohol or drugs?*” (p. 201)
- SER_Q010: “*During your lifetime, have you ever seen, or talked on the telephone, to any of the following professionals about your emotions, mental health or use of alcohol or drugs?*” (p. 205)
- SER_Q103: “*During the past 12 months, was there ever a time when you felt that you needed help for your emotions, mental health or use of alcohol or drugs, but you didn’t receive it?*” (p. 230)

Design and Procedure

The majority of data analyses took place at the University of Toronto Research Data Centre. A proportion of analysis also took place at Lakehead University utilizing a public use microdata file through a partnership with the University of Western Ontario. SPSS was used for data analyses. Population based weights for correction of over/under sampling of the survey population were provided by Statistics Canada.

The analytic design followed by Stephens, Dulberg, and Joubert (1999) in their study of Canadian mental health based on the National Population Health Survey (NPHS) was employed for the current study. The relationships of disordered eating (dependent variable) with the physical and psychological health co-morbidities previously listed (independent variables) were

investigated through the calculation of the Odds Ratio (OR).

OR is the increase (or decrease if the ratio is less than one) in odds of being in one outcome group when the value of the predictor variable increases by one unit; a predictor variable with an OR of 1 provides no predictive value. (Tabachnick & Fidell, 2001). For example, an OR of 1.5 indicates that the outcome variable (i.e., disordered eating) is 1.5 times (or 50%) more likely to occur with a one unit increase in a predictor variable; an OR of 0.5 indicates that the outcome variable is 0.5 times as likely (or 50% *less* likely; $1-0.5 = 0.5$) with a one unit increase in a predictor variable; an OR of 1.0 indicates that the outcome variable is neither more nor less likely to occur with a one unit increase in a predictor variable: In other words, the predictor variable has no predictive value.

The 95% confidence interval (CI) is typically referred to in interpreting the statistical significance of the OR. A CI includes an upper and lower value, and the true OR will have a 95% chance of falling somewhere between these two limits. Therefore, in order for an OR to be deemed statistically significant, the range that falls between the upper and lower bound of CI cannot contain 1.0. For example, if an OR of 1.5 is obtained, and the CI ranges from 1.4-2.0, it can be concluded that there is a 95% chance that the true population value of the OR falls somewhere from 1.4 to 2.0. Because the CI does not include 1.0, the result is considered to be statistically significant at $p < .05$.

Results

Database

Information was obtained from 13,184 people living in Ontario aged 15 years and older. After applying a population based weight, an N of 9,655,881 was obtained. When missing data

was controlled for, an N of 9,619,939 was available for analysis. The Ontario sample consisted of 4,730,385 men (49%) and 4,925,495 women (51%).

Main Analyses

Prevalence of Disordered Eating

The first research question to be addressed was the prevalence of disordered eating among adults and older adolescents in Ontario. Disordered eating was measured using the *EAT-26*, a standardized measure of symptoms and concerns characteristic of eating disorders. The reliability of the *EAT-26* in the current study was calculated with *Cronbach's Alpha* ($r = .836$). Before the *EAT-26* was administered, Ontario respondents (weighted $N = 9,619,939$) were asked the following two screener questions:

1. “*Was there ever a time in your life when you had a strong fear or a great deal of concern about being too fat or overweight?*”
2. “*During the past 12 months, did you have a strong fear or a great deal of concern about being too fat or overweight?*”

The 14.8% of respondents who answered yes to both screener questions (weighted $N = 1,418,993$) were then administered the *EAT-26*. Using the weighted population, 12.6% of the screener-endorsing respondents ($N = 178,887$) were found to be at high risk (score of 21 or higher on the *EAT-26*) for disordered eating. Overall, this represents an Ontario population 12-month prevalence of 1.9% among citizens 15 years of age and older.

Disordered Eating as Function of Demographics

Crosstabs was used to examine the relationship between disordered eating and age, gender, and regions of Ontario. A crosstable between disordered eating risk and gender (see

Table 1) showed that of the entire weighted Ontario population, 3.1% of females, and 0.6% of males scored 21 or higher on the *EAT-26*. Of those scoring high on the *EAT-26*, 84.4 % were female.

Table 1

Prevalence of Disordered Eating by Gender

Gender	Disordered Eating
% Male	0.6
% Female	3.1
% Total	1.9

Note. Disordered eating classified as *EAT-26* score of 21 or higher.

A crosstable between disordered eating and age (see Table 2) showed the variation of disordered eating across different age brackets, with the majority of cases of disordered eating presenting in young to middle adulthood. Presence of disordered eating decreases with increasing age categories, *point-biserial* $r = -.022, p < .001$.

Table 2

Prevalence of Disordered Eating by Age

Age	Disordered Eating
% 15-19	2.2
% 20-24	2.4
% 25-29	1.6
% 30-34	2.0
% 35-39	2.3
% 40-44	1.9
% 45-49	1.8
% 50-54	1.8
% 55-59	1.6
% 60-64	2.2
% 65-69	0.9
% 70-74	0.8
% 75-79	2.2
% 80 +	0.6
% Total	1.9

Note. Disordered eating classified as *EAT-26* score of 21 or higher.

In terms of geographical region, Ontario was divided into seven areas: Southwest Ontario, Central South Ontario, Central West Ontario, Central East Ontario, Toronto, Eastern Ontario, and Northern Ontario. Table 3 summarizes a crosstable between disordered eating and geographical region of Ontario, and shows that the prevalence of disordered eating varied significantly by region, $X^2(6, N = 9,619,939) = 8,932, p < .001$.

Table 3

Prevalence of Disordered Eating by Geographical Region of Ontario

Region	Disordered Eating
% South West Ontario	1.3
% Central South Ontario	1.4
% Central West Ontario	1.9
% Central East Ontario	1.9
% Toronto	1.9
% Eastern Ontario	2.7
% Northern Ontario	1.5
% Total	1.9

Note. Disordered eating classified as *EAT-26* score of 21 or higher.

Psychological and Health Co-Morbidities

Next to be examined were the psychological and medical co-morbidities associated with disordered eating. The following variables were examined for their ability to predict group membership (disordered eating vs. non-disordered eating) of Ontario residents given the *EAT-26*:

- Having a chronic condition (e.g., heart disease, diabetes) diagnosed by a healthcare professional;
- Body Mass Index (BMI);
- Major depressive episode in lifetime (includes 12 months prior to interview);
- Major depressive episode in 12 months prior to interview;
- Panic attack in lifetime (includes 12 months prior to interview);
- Panic attack in 12 months prior to interview;

- Panic disorder in lifetime (includes 12 months prior to interview);
- Panic disorder in 12 months prior to interview;
- Social phobia in lifetime (includes 12 months prior to interview);
- Social phobia in 12 months prior to interview;
- Agoraphobia in lifetime (includes 12 months prior to interview);
- Agoraphobia in 12 months prior to interview;
- Alcohol dependence in 12 months prior to interview;
- Any illicit drug use (including “one time only” use of cannabis) in lifetime (includes 12 months prior to interview);
- Any illicit drug use (including “one time only” use of cannabis) in 12 months prior to interview;
- Illicit drug dependence in 12 months prior to interview.

Demographic Predictors

Gender was dichotomously coded as 0 = male and 1 = female. Age and region of Ontario were on a continuum, with higher coded values indicating older age and more Eastern areas of Ontario, respectively. Table 4 summarizes the results of the predictive abilities of the demographic variables, and indicates that being female increases the risk of disordered eating by more than 5 times, while older age decreases the risk of disordered eating. Geographical region of Ontario also has a significant effect, in that disordered eating risk increases heading towards Eastern Ontario. (See Tables 1-3 for crosstables on these relationships).

Table 4

Demographic Variables as Predictors of Disordered Eating

Disordered Eating	Demographic Predictor	OR	CI
Yes	Gender	5.43	(5.36 - 5.50)
	Age	0.95	(0.95 - 0.95)
	Region of Ontario	1.09	(1.09 - 1.09)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. OR = odds ratio; CI = 95 % confidence interval for the OR.

Health Predictors

The predictive abilities of chronic health conditions and BMI in distinguishing between disordered eating versus non-disordered eating groups were examined using OR. Several chronic conditions were dichotomously coded 0 = no and 1 = yes (yes, the individual had a diagnosis of at least one chronic condition, such as diabetes, heart disease, or asthma, diagnosed by their healthcare professional). BMI included 4 levels with underweight < 20, acceptable weight 20 - 24.9, overweight 25 - 29.9, and obese 30+. Table 5 summarizes the predictive abilities of the health variables, and shows that having a chronic health condition and a higher BMI are each associated with higher probability of having disordered eating.

Table 5

Health Variables as Predictors of Disordered Eating

Disordered Eating	Health Predictor	OR	95 % CI
Yes	Chronic Condition	1.60	(1.58 - 1.62)
	BMI	1.65	(1.65 - 1.66)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 6 further examines the relationship between disordered eating and health variables and shows that the majority of chronic conditions examined are each associated with increase in risk of disordered eating. Chronic fatigue syndrome and post-traumatic stress disorder increased the risk of disordered eating by more than 4 times, while other long-term physical or mental health conditions or psychosis more than doubled the risk of disordered eating. Over a quarter of respondents with high *EAT-26* scores suffered from non-food allergies and back problems, while over 20 % of high *EAT-26* scoring respondents suffered from arthritis/rheumatism or high blood pressure.

Table 6

Disordered Eating as a Function of Chronic Conditions

Chronic Condition	Disordered Eating		OR	95 % CI
	% Yes	% No		
Food allergies	9.7	7.5	1.31	(1.29 - 1.33)
Other allergies	33.5	30.8	1.13	(1.12 - 1.14)
Asthma	14.0	8.7	1.70	(1.67 - 1.72)
Fibromyalgia	2.9	1.7	1.65	(1.61 - 1.70)

Arthritis or Rheumatism	24.2	19.2	1.34	(1.33 - 1.36)
Back problems	33.3	21.4	1.81	(1.79 - 1.83)
High blood pressure	21.0	15.2	1.47	(1.46 - 1.49)
Migraine headaches	19.0	11.0	1.86	(1.84 - 1.88)
Chronic bronchitis	4.9	3.1	1.60	(1.56 - 1.63)
Emphysema/Chronic pulmonary disease	1.2	1.3	0.89	(0.84 - 0.93)
Diabetes	8.1	4.9	1.71	(1.68 - 1.73)
Epilepsy	0.4	0.6	0.76	(0.71 - 0.82)
Heart disease	6.7	5.4	1.27	(1.25 - 1.29)
Cancer	1.5	2.1	0.72	(0.70 - 0.75)
Stomach or intestinal ulcers	5.1	4.2	1.22	(1.20 - 1.25)
Suffers from effects of a stroke	0.7	1.1	0.67	(0.63 - 0.71)
Bowel disorder/Crohn's disease	5.1	2.8	1.86	(1.82 - 1.90)
Cataracts	4.2	5.1	0.83	(0.81 - 0.85)
Glaucoma	0.6	1.8	0.34	(0.32 - 0.36)
Thyroid condition	8.1	5.8	1.42	(1.40 - 1.44)
Chronic fatigue syndrome	5.0	1.1	4.34	(4.26 - 4.43)
Multiple chemical sensitivities	3.3	1.9	1.68	(1.64 - 1.73)
Other psychosis	1.7	0.8	2.15	(2.07 - 2.22)
Post-traumatic stress disorder	4.2	1.0	4.22	(4.13 - 4.32)
Learning disability	4.1	2.4	1.75	(1.71 - 1.79)
Other long-term physical or mental health conditions	24.1	12.6	2.16	(2.14 - 2.19)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. No disordered eating classified as *EAT-26* score of under 21, or failure of the participant to endorse screener questions.

OR = odds ratio; CI = 95 % confidence interval for the OR.

The relationship between disordered eating and BMI is further examined in Table 7, which reveals that obesity (a BMI of 30 or greater) more than triples the risk of disordered eating, while being under, average, or overweight decreases disordered eating risk; 34.3 % of obese respondents were classified as eating disordered.

Table 7

Disordered Eating as a Function of Body Mass Index (BMI)

BMI	Disordered Eating		OR	95 % CI
	% Yes	% No		
Under 20 (underweight)	6.3	9.1	0.68	(0.66 - 0.69)
20 - 24.9 (average weight)	29.5	42.7	0.56	(0.56 - 0.57)
25 - 29.9 (overweight)	25.8	32.0	0.74	(0.73 - 0.75)
30 + (obese)	34.3	14.5	3.07	(3.04 - 3.10)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. No disordered eating classified as *EAT-26* score of under 21, or failure of the participant to endorse screener questions. OR = odds ratio; CI = 95 % confidence interval for the OR.

Psychological Predictors

The predictive abilities of psychological variables in distinguishing between disordered eating versus non-disordered eating groups was examined using separate OR analyses for lifetime (Table 8) and 12-month prevalence (Table 9). All psychological variables were dichotomously coded, 0 = no and 1 = yes (yes, this individual suffered from a particular disorder at least once in their lifetime, or in the past 12 months). Table 8 summarizes the ability of the lifetime psychological disorders to predict disordered eating, as well as the prevalence of lifetime

psychological disorders in the two groups of disordered eating versus non-disordered eating respondents.

Table 8

Lifetime Prevalence of Psychological Disorders as Predictors of Disordered Eating

Psychological Disorder	Disordered Eating		OR	95 % CI
	% Yes	% No		
Depression	28.4	10.6	3.24	(3.21 - 3.28)
Panic attack	40.1	19.3	2.72	(2.70 - 2.75)
Panic disorder	13.7	3.3	4.46	(4.40 - 4.51)
Social phobia	19.0	7.7	2.74	(2.71 - 2.77)
Agoraphobia	5.2	1.2	4.18	(4.10 - 4.27)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. No disordered eating classified as *EAT-26* score of under 21, or failure of the participant to endorse screener questions. OR = odds ratio; CI = 95 % confidence interval for the OR.

All of the lifetime psychological disorders examined were able to predict disordered eating. Panic disorder and agoraphobia more than quadrupled the risk of disordered eating, while panic attack and social phobia more than doubled the risk. Lifetime prevalence of depression increased the risk of disordered eating by more than 3 times. Crosstabs revealed that over a quarter of disordered eating respondents had suffered from depression at least once in their lifetime, while 40.1 % of disordered eating respondents had a lifetime history of panic attack.

Next to be examined was the 12-month prevalence of psychological disorders as predictors of disordered eating. As can be seen in Table 9, all of the 12-month psychological disorders were able to distinguish those who had high *EAT-26* scores from those who had low

EAT-26 scores and/or those who had not endorsed the weight concern screener questions.

Table 9

12-month Prevalence of Psychological Disorders as Predictors of Disordered Eating

Psychological Disorder	Disordered Eating		OR	95 % CI
	% Yes	% No		
Depression	19.7	4.5	4.88	(4.82 - 4.93)
Panic attack	19.3	7.8	2.74	(2.71 - 2.77)
Panic disorder	8.2	1.3	6.00	(5.91 - 6.10)
Social phobia	10.9	3.1	3.64	(3.59 - 3.69)
Agoraphobia	3.7	0.6	5.94	(5.80 - 6.08)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. No disordered eating classified as *EAT-26* score of under 21, or failure of the participant to endorse screener questions. OR = odds ratio; CI = 95 % confidence interval for the OR.

12-month prevalence of panic disorder increased the risk of disordered eating by 6 times, with 8.2 % of disordered eating respondents suffering from panic disorder in the 12 months prior to interview, compared to 1.3 % of non-disordered eating respondents. 12-month prevalence of depression more than quadrupled the risk of disordered eating, with almost 20 % of disordered eating respondents experiencing major depressive disorder in the 12 months prior to interview, compared to 4.5 % of non-disordered eating respondents.

Alcohol/Substance Predictors

The predictive abilities of alcohol and substance use and dependence in distinguishing between disordered eating versus non-disordered eating groups was examined using OR. The alcohol and substance variables were dichotomously coded as 0 = no and 1 = yes (yes, the

respondent used or was dependent on illicit drugs or alcohol at least once in their lifetime, or in the 12 months prior to interview). Table 10 summarizes the ability of the alcohol and substance disorders to predict disordered eating, as well as the prevalence of alcohol and substance use and dependence in disordered eating versus non-disordered eating respondents.

Table 10

Alcohol and Substance Disorders as Predictors of Disordered Eating

Alcohol/Substance Disorder	Disordered Eating			95 % CI
	% Yes	% No	OR	
12-month alcohol dependence	3.8	2.1	1.87	(1.83 - 1.92)
12-month illicit drug dependence	1.0	0.5	1.79	(1.71 - 1.88)
12-month illicit drug use	17.5	10.6	1.78	(1.76 - 1.80)
Lifetime illicit drug use	46.2	37.5	1.42	(1.41 - 1.43)

Note. Disordered eating classified as *EAT-26* score of 21 or higher. No disordered eating classified as *EAT-26* score of under 21, or failure of the participant to endorse screener questions. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 10 shows that all of the alcohol and substance predictors examined increased the risk of disordered eating. 46.2 % of disordered eating respondents had used illicit drugs at least once in their lifetime, while 17.5 % had used illicit drugs at least once in the 12 months prior to interview. Illicit drug dependence in the 12 months prior to interview had been experienced by 1 % of disordered eating respondents compared to 0.5 % of non-disordered eating respondents. 3.8 % of eating disordered respondents had experienced alcohol dependence in the 12 months prior to interview.

Healthcare Utilization

The final research interest of the current study was healthcare utilization among individuals with disordered eating. The following areas of healthcare utilization were examined:

- Being hospitalized overnight or longer in lifetime in any type of healthcare facility for problems with emotions, mental health, or use of alcohol or drugs;
- Being hospitalized overnight or longer in the past 12 months in any type of healthcare facility for problems with emotions, mental health, or use of alcohol or drugs;
- Lifetime consultations with any professional for problems concerning emotions, mental health, or use of alcohol or drugs;
- Lifetime use of any resources (hospitalization, consultation with professional, use of internet support group or chat room, use of self-help group, or use of telephone helpline) for problems with emotions, mental health, or use of alcohol or drugs.

In addition to these measures of healthcare utilization, the following barriers to healthcare utilization were also examined:

- Accessibility barriers (cost, lack of transportation, or issues such as childcare or scheduling);
- Acceptability barriers (where individuals chose not to seek mental health care because of competing demands on their time, or because of their attitudes towards illness, healthcare providers, or the healthcare system);
- Availability barriers (waiting too long for services, services not available in area, or at the time of need).

Prevalence of Healthcare Utilization

One hypothesis of the current study was that eating disordered adults with psychological co-morbidities would be more likely to utilize healthcare services for mental health issues compared to those without co-morbidities. To test this hypothesis, four groups of respondents were examined: those with *EAT-26* scores of 21 or higher; those with any selected Axis I psychological or substance disorder in the previous 12 months; those with both high *EAT-26* scores and any selected Axis I disorder (co-morbid group); and those with neither (comparison group). Table 11 summarizes the healthcare utilization of these groups.

Table 11

Healthcare Utilization as a Function of Four Groups of Respondents

Resource Utilized	Comparison		Disordered Eating		Axis I Disorder			Co-morbid		
	%	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI
Hospitalized in lifetime	3.5	7.6	2.26	(1.41 - 3.63)	14.9	4.78	(4.14 - 5.51)	29.0	11.20	(7.47 - 16.79)
Hospitalized past 12 months	0.2	0.9	4.62	(1.69 - 12.63)	3.0	15.85	(10.58 - 23.74)	5.5	29.65	(14.85 - 59.22)
Consultation with healthcare professionals	19.0	39.8	2.82	(1.92 - 4.15)	58.0	5.90	(5.31 - 6.55)	73.5	11.84	(7.88 - 17.79)
Use of any resources	20.9	42.6	2.81	(1.94 - 4.08)	60.6	5.82	(5.23 - 6.47)	77.6	13.15	(8.58 - 20.16)

Note. Disordered Eating = *EAT-26* score of 21 or higher. Axis I Disorder = 12-month presence of any selected psychological disorder. Co-morbid = presence of both disordered eating and an Axis I disorder. Each OR is in relation to the comparison group. Comparison = absence of both disordered eating and an Axis I disorder. OR = odds ratio; CI = 95 % confidence interval for the OR.

Among the four groups of respondents, 1.1 % of individuals suffered from disordered eating alone, 9.9 % had an Axis I disorder alone in the previous 12 months, 0.6 % were co-morbid for both disordered eating and an Axis I disorder, and 88.4 % had neither disordered eating nor an Axis I disorder. Table 11 shows that respondents who were co-morbid for both disordered eating and an Axis I disorder had a higher prevalence of healthcare utilization for mental health issues than respondents who were eating disordered alone, respondents who had an Axis I disorder alone, and respondents who had neither an eating disorder or an Axis I disorder. 73.5 % of co-morbid respondents had consulted with a healthcare professional at least once in their lifetime for problems concerning emotions, mental health, or use of alcohol or drugs, while 77.6 % of co-morbid respondents had utilized any resource, including resources such as the internet. Among the three disordered groups, those with an eating disorder alone had the lowest rates of healthcare utilization, albeit substantially above that of comparison respondents.

Table 11 also shows that having disordered eating, an Axis I disorder, or both increased the odds of utilizing all healthcare services, in comparison to those individuals who had neither an eating disorder or an Axis I disorder. Being co-morbid for both an eating disorder and an Axis I disorder increased the odds of being hospitalized in the 12 months prior to interview by almost 30 times, while it increased the odds of being hospitalized at least once in lifetime, consulting with professionals, and utilizing any resources by more than 11 times.

Barriers to Healthcare Utilization

Barriers to healthcare utilization reported by eating disordered respondents, in comparison to respondents with an Axis I disorder, respondents who were co-morbid for both a disordered and an Axis I disorder, and respondents who had neither an eating or Axis I disorder were

examined. Table 12 displays the prevalence of healthcare utilization barriers.

Table 12

Healthcare Utilization Barriers Reported by Four Groups of Respondents

Barrier	Comparison	Disordered Eating			Axis I Disorder			Co-morbid		
	%	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI
Availability	0.3	0.7	1.91	(0.63 - 5.75)	4.1	12.35	(8.48 - 18.00)	9.1	28.70	(16.03 - 51.39)
Accessibility	0.3	0.4	1.56	(0.35 - 6.91)	2.9	10.53	(7.34 - 15.12)	4.5	16.85	(8.45 - 33.60)
Acceptability	2.0	6.7	3.52	(2.15 - 5.75)	15.0	8.67	(7.30 - 10.30)	24.5	16.01	(10.58 - 24.22)

Note. Disordered Eating = *EAT-26* score of 21 or higher. Axis I Disorder = 12-month presence of any selected psychological disorder. Co-morbid = presence of both disordered eating and an Axis I disorder. Each OR is in relation to the comparison group. Comparison = absence of both disordered eating and an Axis I disorder. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 12 shows that the most prevalent barrier reported across all groups was acceptability. Acceptability barriers are internal, where individuals choose not to utilize healthcare services because of their attitudes towards illness, healthcare providers, or the healthcare system. Almost a quarter of co-morbid respondents were reluctant to utilize healthcare services because of acceptability issues. The least prevalent barrier reported across all groups was accessibility barriers. Co-morbid respondents reported the highest prevalence across all barriers. Among the disordered groups, respondents with an eating disorder alone reported the least prevalence of barriers, followed by those with an Axis I disorder alone.

Table 12 also shows that experiencing disordered eating, an Axis I or a co-morbid disorder increased the odds of reporting a barrier to healthcare utilization, in comparison to those respondents who did not have these disorders. Having disordered eating and a co-morbid Axis I disorder increased the odds of reporting an availability barrier by over 28 times, while it increased the odds of reporting an accessibility or acceptability barrier by over 16 times. The odds of reporting an availability or accessibility barrier increased by over 10 times in respondents with an Axis I disorder. The odds of reporting an acceptability barrier more than tripled in respondents with disordered eating, while the odds of reporting an availability barrier almost doubled.

Healthcare Utilization of Eating Disordered Respondents as a Function of Demographics

Next to be examined was the healthcare utilization of eating disordered respondents as a function of gender, age, and geographical region of Ontario. Table 13 displays healthcare utilization by gender, as well as the predictive abilities of the healthcare utilization variables to distinguish between female and male eating disordered respondents.

Table 13

Healthcare Utilization of Eating Disordered Respondents by Gender

Resource Utilized	Gender			OR	95 % CI
	% Female	% Male	% Total		
Hospitalized in Lifetime	12.2	9.4	11.7	1.04	(1.04 - 1.05)
Hospitalized past 12 months	2.0	0.0	1.7	1.19	(1.19 - 1.19)
Consultation with Healthcare Professionals	43.5	27.8	41.1	1.11	(1.10 - 1.11)
Use of Any Resource	45.8	30.7	43.5	1.10	(1.10 - 1.11)

Note. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 13 shows that being female increased the odds of utilizing all healthcare resources for problems with emotions, mental health, or use of alcohol or drugs. Over 40 % of eating disordered females had consulted with healthcare professionals, or had utilized any resource, including resources such as the internet. Over 12 % of eating disordered females had been hospitalized at least once in their lifetime, and 2 % had been hospitalized in the 12 months prior to interview, for problems with emotions, mental health, or use of alcohol or drugs.

Healthcare utilization of eating disordered respondents was also examined as a function of age. The results are displayed in Table 14.

Table 14

Healthcare Utilization of Eating Disordered Respondents by Age

Resource Utilized	15-24 years			25-44 years			45-64 years			65 years or older		
	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI
Hospitalized in lifetime	8.5	3.46	(3.33 - 3.60)	14.1	4.49	(4.40 - 4.59)	11.3	1.83	(1.79 - 1.88)	8.6	1.78	(1.68 - 1.88)
Hospitalized in past 12 months	5.2	15.12	(14.33 - 15.96)	0.9	2.11	(1.95 - 2.28)	0.5	1.19	(1.05 - 1.33)	1.8	6.03	(5.33 - 6.82)
Consultation with healthcare professionals	29.4	2.18	(2.13 - 2.23)	41.1	2.35	(2.31 - 2.38)	52.3	3.59	(3.53 - 3.65)	29.2	2.63	(2.54 - 2.72)
Use of any resource	39.6	2.92	(2.85 - 2.98)	41.6	2.23	(2.19 - 2.26)	52.3	3.19	(3.13 - 3.24)	31.3	2.39	(2.31 - 2.47)

Note. Each OR is in relation to respondents of the same age cohort without disordered eating. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 14 shows that across all age groups, there is a higher risk of utilizing healthcare services for problems with mental health, emotions, or use of alcohol or drugs, when the respondents are eating disordered. Lifetime hospitalizations occurred most frequently in younger eating disordered adults aged 25-44, while consultations with healthcare professionals and use of any resources, including resources such as the internet, were reported by over half of eating disordered older adults aged 45-64. Adolescents and young adults, aged 15-24, with disordered eating were 15 times more likely to be hospitalized in the 12 months prior to interview than adolescents and young adults without disordered eating. 5.2 % of eating disordered respondents between 15 and 24 had been hospitalized in the 12 months prior to interview for problems with mental health, emotions, or use of alcohol or drugs.

Healthcare utilization of high *EAT-26* scoring respondents was also examined as a function of geographical region of Ontario. Table 15 displays the crosstable and shows that healthcare utilization of disordered eating respondents varied significantly across geographical regions of Ontario. The lowest prevalence of lifetime hospitalization occurred in Toronto, while over 17 % of eating disordered respondents in South West, Central South, and Northern Ontario had been hospitalized at least once in their lifetime for problems with mental health, emotions, or use of alcohol or drugs. No eating disordered respondents in South West Ontario had reported being hospitalized in the 12 months prior to interview, while 6.1 % of respondents in Central South Ontario had been. Over half of the eating disordered respondents from Eastern and Northern Ontario had consulted with healthcare professionals, or had utilized any resource, including resources such as the internet, for problems with mental health, emotions, or use of alcohol or drugs.

Table 15

Healthcare Utilization of Eating Disordered Respondents By Geographical Region of Ontario

Region	Resource			
	Hospitalized in lifetime	Hospitalized in past 12 months	Consultation with healthcare professionals	Use of any resources
% South West Ontario	17.4	0.0	45.9	45.9
% Central South Ontario	17.1	6.1	38.1	42.5
% Central West Ontario	14.2	3.0	49.7	49.7
% Central East Ontario	9.2	0.9	37.5	40.7
% Toronto	5.5	1.1	23.7	24.7
% Eastern Ontario	12.4	0.8	51.5	58.1
% Northern Ontario	17.8	2.8	51.9	51.9
% Total	11.7	1.7	41.1	43.5
X ² (6, 178,887)	3,132.24 *	2,514.72 *	8,419.81 *	9,730.69 *

* $p < 0.01$ *Healthcare Barriers of Eating Disordered Respondents as a Function of Demographics*

Barriers to healthcare utilization experienced by individuals scoring 21 or higher on the *EAT-26* were examined as a function of demographics. Table 16 displays the crosstable of healthcare utilization barriers by gender, as well as the abilities of the healthcare barriers in distinguishing male and female eating disordered respondents.

Table 16

Healthcare Barriers of Eating Disordered Respondents by Gender

Barrier	Gender			OR	95 % CI
	% Female	% Male	% Total		
Availability	1.3	7.0	2.2	0.58	(0.56 - 0.60)
Accessibility	1.0	1.5	1.1	0.93	(0.91 - 0.95)
Acceptability	13.2	11.6	12.9	1.02	(1.02 - 1.03)

Note. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 16 indicates that the barriers to healthcare utilization were able to distinguish among male and female high *EAT-26* scoring respondents, with females more likely to report acceptability barriers than males. Males were more likely to report availability and accessibility barriers than females.

The relationship between healthcare utilization barriers of disordered eating respondents and age was also examined. The results are summarized in Table 17.

Table 17

Healthcare Barriers of Eating Disordered Respondents by Age

Barrier	15-24 years			25-44 years			45-64 years			65 years or older		
	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI	%	OR	95 % CI
Availability	2.6	4.18	(3.90 - 4.48)	3.7	4.78	(4.60 - 4.97)	0.3	0.27	(0.23 - 0.31)	0.0	1.00	(1.00 - 1.00)
Accessibility	4.0	7.32	(6.92 - 7.75)	0.7	0.91	(0.84 - 0.99)	0.0	1.00	(1.00 - 1.00)	0.0	1.00	(1.00 - 1.00)
Acceptability	34.6	8.80	(8.61 - 9.01)	11.4	2.92	(2.86 - 2.99)	2.8	1.30	(1.23 - 1.37)	4.9	8.15	(7.54 - 8.80)

Note. Each OR is in relation to respondents of the same age cohort without disordered eating. OR = odds ratio; CI = 95 % confidence interval for the OR.

Table 17 shows that more barriers to healthcare utilization were reported in the youngest age group of 15-24 years, compared to the other age groups. Almost 35 % of adolescents and young adults with an eating disorder reported acceptability barriers to healthcare utilization. There were little to no reports of availability or accessibility barriers in eating disordered older adults and seniors.

Also examined was healthcare utilization barriers experienced by disordered eating respondents as a function of geographical region of Ontario. Table 18 summarizes the results.

Table 18

Healthcare Barriers of Eating Disordered Respondents by Geographical Region of Ontario

Region	Barrier		
	Availability	Accessibility	Acceptability
% South West Ontario	0.0	5.0	5.0
% Central South Ontario	4.3	1.7	22.8
% Central West Ontario	1.9	0.8	19.2
% Central East Ontario	6.2	1.4	7.5
% Toronto	1.0	0.0	11.4
% Eastern Ontario	0.0	0.3	10.4
% Northern Ontario	3.2	1.9	23.5
% Total	2.2	1.1	12.9
X ² (6, 178,889)	6,657.92 *	3,059.04 *	5,305.94 *

* $p < 0.001$

Table 18 shows that barriers to healthcare utilization significantly varied across regions of Ontario. The highest rate of availability barriers were reported by eating disordered respondents

in Central East Ontario, while the highest rate of accessibility barriers were reported by eating disordered respondents in South West Ontario. Over 22 % of eating disordered respondents in Central South Ontario, and 23.5 % of eating disordered respondents in Northern Ontario reported acceptability barriers to healthcare utilization.

Discussion

The present study examined the prevalence of disordered eating in Ontario, the health and psychological variables co-morbid with disordered eating, and the healthcare utilization trends among individuals identified as disordered eating. Disordered eating was measured using the *EAT-26*, an instrument that research has shown to have good screening capabilities for eating disorders (i.e., Mintz & O' Halloran, 2000). The *EAT-26* was administered to a weighted $N = 1,418,993$ respondents who had endorsed 2 weight concern screener questions. Of these respondents, weighted $N = 1,178,887$ were found to be at high risk (score of 21 or higher on the *EAT-26*) for disordered eating, and an overall prevalence rate of 1.9 % was obtained among Ontario citizens 15 years of age and older. The high number of individuals who endorsed the 2 screener questions (14.8 % of the entire Ontario population) showed that a high score on the *EAT-26* alone is not required to feel some discomfort with one's body, and that there are many people in Ontario who may not meet diagnostic criteria for disordered eating, but who feel that they are "too fat."

Disordered eating was found to be most prevalent among females, with a prevalence rate of 3.1 %, while males had a prevalence rate of 0.6 %. This result supports one hypothesis of the current study. These rates are slightly higher than those found in previous research (i.e., Garfinkel et al., 1995; Woodside et al., 2001), and may be attributable to the less restrictive screening

criteria used in the present study, as well as the larger sample size. The higher prevalence rate among females is most likely attributable to the greater societal pressures for thinness that are placed on females, in comparison to males.

The current study found that disordered eating was most prevalent in young to middle adulthood, with a decrease in disordered eating seen in the oldest age groups, which supports a hypothesis of the current study. However, of those respondents who were identified as eating disordered, similar percentages were from the 15-19 age group, the 60-64 age group, and the 75-79 age group. These results show that disordered eating is not only a problem of adolescence, and is presenting itself later in life. This could be an indication of lack of appropriate diagnosis and treatment in the healthcare system. Many older women may also be experiencing societal pressures for body perfection. Advertisers know that they must market their products to individuals who will be able to buy them, and older women are more likely to have greater purchasing power than young girls.

Disordered eating was found to be most prevalent in Eastern Ontario, followed by Toronto, Central West, and Central East Ontario. Higher disordered eating rates in more populated areas of Ontario support a hypothesis of the current study. Advertising may explain why disordered eating is more prevalent in the more highly populated areas of Ontario. Larger towns and cities have more media exposure, such as greater access to satellite and cable television, and greater newspaper and magazine variety and circulation. Larger centres are also more likely to introduce “the latest”, such as the latest diet, the latest workout routine, and the latest fashions available in the smallest sizes.

As was hypothesized, and consistent with past research, the present study showed

considerable co-morbidities between disordered eating and various health and psychological variables. Being female increased the risk of disordered eating by more than 5 times, while older age decreased the risk of disordered eating. Geographical region of Ontario also had a significant effect, in that disordered eating risk increased heading towards Eastern Ontario.

The presence of a chronic condition increased the risk of disordered eating. In some cases, a chronic condition such as post-traumatic stress disorder (PTSD) may lead to disordered eating. PTSD results from a traumatic or stressful occurrence, which can lead to disordered eating on its own, or to other psychological disorders that are subsequently co-morbid with disordered eating. In other cases, a chronic condition, such as diabetes, may lead to disordered eating. Diabetes involves weight management and control of food intake, and taken to the extremes could result in an eating disorder.

Body mass index (BMI) was also a predictor of disordered eating. Obesity (BMI of 30 or greater) more than tripled the risk of disordered eating. This may be explained by the fact that obese respondents would be more likely be engaging in dieting behaviour, or receiving messages from significant others that they should lose weight. The shame and stigma associated with obesity could lead to excessive and extreme weight control measures.

As hypothesized, there were substantial psychological co-morbidities associated with disordered eating. Lifetime prevalence of panic disorder and agoraphobia more than quadrupled the risk of disordered eating, while lifetime prevalence of panic attack and social phobia more than doubled the risk. Lifetime prevalence of depression increased the risk of disordered eating by more than 3 times. 12-month prevalence of the psychological variables were also able to distinguish eating disordered from non-eating disordered respondents. 12-month prevalence of

panic disorder increased the risk of disordered eating by 6 times, while 12-month prevalence of depression more than quadrupled the risk of disordered eating.

Alcohol and illicit drug use and dependence was able to distinguish disordered eating versus non-disordered eating respondents. 12-month alcohol dependence, 12-month drug use and dependence, and lifetime drug use increased the risk of disordered eating. 46.2 % of disordered eating respondents had used illicit drugs at least once in their lifetime, while 17.5 % had used illicit drugs at least once in the 12 months prior to interview.

While co-morbidities were shown to exist, it is unclear as to whether disordered eating is a cause or a consequence of a psychological disorder. Various hypotheses have been proposed to explain the relationship between disordered eating and psychological co-morbidities. Starvation can contribute to elevations in corticotropin-releasing hormone (CRH), which may then contribute to depression (Altemus & Gold, 1992). Another hypothesis has suggested that eating disorders are a variant of mood disorders (Hudson, Laffer, & Pope, 1982). The food deprivation hypothesis suggests that removal of the primary reinforcer, food, leads to increased reinforcement value for other available reinforcers, such as drugs and alcohol (Wolfe & Maisto, 2000). A developmental perspective proposes that some individuals may be particularly sensitive to social pressures to conform to a thin ideal, and for experimenting with drugs (Krahn, Kurth, Demitrack, & Drewnowski, 1992).

Supporting a hypothesis of the current study, the healthcare utilization data showed that respondents who were co-morbid for both disordered eating and an Axis I disorder had a higher prevalence of healthcare utilization than respondents who were eating disordered alone, respondents who had an Axis I disorder alone, and respondents who had neither an eating

disorder or an Axis I disorder. In fact, respondents who were eating disordered alone had the lowest rates of healthcare utilization among the three “disordered” groups. This may be explained by the “vain” nature of eating disorders. Many respondents who have an eating disorder do not feel that they have a “problem”, and may like the way disordered eating makes their bodies look. Getting treatment for an eating disorder means admission of a problem, and willingness to reach a healthy body weight, something most eating disordered individuals do not want. On the other hand, depression, anxiety, and phobia do not feel good, and most individuals would gladly accept relief from their symptoms.

Having an eating disorder, an Axis I disorder, or both increased the odds of being hospitalized at least once in lifetime, hospitalized in the 12 months prior to interview, consulting with healthcare professionals, or using any resources, including resources such as the internet, for problems with mental health, emotions, or use of drugs or alcohol, in comparison to those individuals who had neither an eating disorder or an Axis I disorder. Being co-morbid for both an eating disorder and an Axis I disorder increased the odds of being hospitalized in the 12 months prior to interview by almost 30 times, while it increased the odds of being hospitalized at least once in lifetime, consulting with professionals, and utilizing any resources by more than 11 times.

The majority of eating disordered individuals who utilized healthcare services were female. Over 40 % of eating disordered females had consulted with healthcare professionals, or had utilized any resource, including resources such as the internet. Over 12 % of eating disordered females had been hospitalized at least once in their lifetime, and 2 % had been hospitalized in the 12 months prior to interview, for problems with emotions, mental health, or use of alcohol or drugs. Being female increased the odds of utilizing all healthcare resources for

problems with emotions, mental health, or use of alcohol or drugs, in comparison to being male. This may be explained by the fact that females have higher rates of disordered eating and thus would be seeking treatment, either from their own accord or because of the wishes of significant others, in greater numbers. Females may also be more willing to utilize healthcare services for emotional or substance problems, whereas males might be more reluctant to seek help when needed, due to gender stereotyping and the idea that men don't ask for help.

Healthcare utilization by eating disordered respondents varied across age groups. Lifetime hospitalizations occurred most frequently in eating disordered adults aged 25-44, while consultations with healthcare professionals and use of any resources, including resources such as the internet, were reported by over half of eating disordered older adults aged 45-64. These higher rates of healthcare utilization among mid to older adults supports a hypothesis of the current study. However, adolescents and young adults aged 15-24 with disordered eating were 15 times more likely to be hospitalized in the 12 months prior to interview than adolescents and young adults without disordered eating. 5.2 % of eating disordered respondents between 15 and 24 had been hospitalized in the 12 months prior to interview for problems with mental health, emotions, or use of alcohol or drugs. These hospitalizations could be attributable to family pressures for treatment instead of younger respondents own desire to get help.

Healthcare utilization of eating disordered respondents varied significantly across geographical regions of Ontario. The lowest prevalence of lifetime hospitalization occurred in Toronto, while over 17 % of eating disordered respondents in South West, Central South, and Northern Ontario had been hospitalized at least once in their lifetime for problems with mental health, emotions, or use of alcohol or drugs. No eating disordered respondents in South West

Ontario had reported being hospitalized in the 12 months prior to interview, while 6.1 % of respondents in Central South Ontario had been. Over half of the eating disordered respondents from Eastern and Northern Ontario had consulted with healthcare professionals, or had utilized any resource, including resources such as the internet, for problems with mental health, emotions, or use of alcohol or drugs.

Experiencing disordered eating, an Axis I. or a co-morbid disorder increased the odds of reporting a barrier to healthcare utilization, in comparison to those respondents who did not have these disorders. Having a co-morbid eating and Axis I disorder increased the odds of reporting an availability barrier by over 28 times, while it increased the odds of reporting an accessibility or acceptability barrier by over 16 times. The odds of reporting an availability or accessibility barrier increased by over 10 times in respondents with an Axis I disorder. The odds of reporting an acceptability barrier more than tripled in respondents with disordered eating, while the odds of reporting an availability barrier almost doubled.

When eating disordered, Axis I disordered, co-morbid, and non-disordered respondents were compared, the most prevalent barrier to healthcare utilization reported across all groups was acceptability. Acceptability barriers are internal, where individuals choose not to utilize healthcare services because of their attitudes towards illness, healthcare providers, or the healthcare system. The least prevalent barrier reported across all groups was accessibility barriers, those which involve cost, lack of transportation, or issues such as childcare or scheduling. Co-morbid respondents reported the highest prevalence across all barriers. Among the disordered groups, respondents with an eating disorder alone reported the least prevalence of barriers. This may be explained by prior results obtained in the current study which indicated that eating disordered

individuals had the lowest rates of healthcare utilization, compared to respondents who had an Axis I disorder or who were co-morbid for both an eating and Axis I disorder. Because eating disordered individuals are not utilizing healthcare services much, they may not be experiencing any barriers associated with healthcare utilization.

Barriers to healthcare utilization were able to distinguish among male and female high *EAT-26* scoring respondents, with females more likely to report acceptability barriers than males. This may be explained by the fact that females had higher rates of healthcare utilization than males, and may have had more opportunity for negative experiences, thus instilling a negative attitude towards the healthcare system. Eating disordered males were more likely to report availability and accessibility barriers than eating disordered females, perhaps because of lack of appropriate male-specific treatment options.

Barriers to healthcare utilization were reported most frequently in disordered eating respondents aged 15-24 years, compared to middle adult, older adult, and senior age groups. Almost 35 % of adolescents and young adults with an eating disorder reported acceptability barriers to healthcare utilization. There were little to no reports of availability or accessibility barriers in eating disordered older adults and seniors. Prior results from the current study had shown that 1 in 20 adolescents and young adults with disordered eating had been hospitalized in the 12 months prior to interview for problems with mental health, emotions, or use of drugs and alcohol, and that they were 15 times more likely to be hospitalized than adolescents and young adults without disordered eating. One in three disordered eating respondents in this age group reported a negative internal attitude towards the healthcare system. It appears that adolescents and young adults with eating disorders are being hospitalized at higher rates than other age

groups, and are also reporting more acceptability barriers than other age groups. It is likely that a negative attitude towards the healthcare system is not enough to keep young adults out of hospital due to parental involvement and pressure to get treatment.

Barriers to healthcare utilization significantly varied across regions of Ontario. The highest rate of availability barriers were reported by eating disordered respondents in Central East Ontario, while the highest rate of accessibility barriers were reported by eating disordered respondents in South West Ontario. Over 22 % of eating disordered respondents in Central South Ontario, and 23.5 % of eating disordered respondents in Northern Ontario reported acceptability barriers to healthcare utilization.

The present study showed that there are considerable co-morbidities involved with disordered eating, and any treatment options need to address the overlapping nature of disordered eating and other health and psychological factors, such as chronic health conditions, anxiety, depression, and substance use and abuse. This may involve expansion and elaboration of current treatment options in place. The present study also showed that disordered eating is not only a problem of adolescence, and is presenting itself across wide-ranging age groups. This could be an indication of lack of appropriate services for diagnosis, and treatment, and again may point back to an ineffectiveness of current treatment programs, and subsequent lack of treatment utilization from individuals who hold negative attitudes toward the healthcare system.

As the current study has shown, lack of services is not the problem, as is non-utilization of the services in place. It would be beneficial to explore the overlapping nature of disordered eating with other health and psychological disorders, and to develop treatment programs that are non-singular in their focus. The current study found that co-morbid respondents had higher rates of

healthcare utilization and reported more barriers to healthcare utilization than eating or Axis I disordered respondents alone. Direction for future research could include more extensive study of these co-morbid respondents and their healthcare utilization trends. As well, body image concerns needs to be addressed by any treatment programs and prevention initiatives, as the current study has found that it is prevalent in Ontario. While treatment of formal, criteria-specific, “disordered eating” is of course important, emphasis must also be placed on the more general problem of “disordered thinking.”

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